Radio

Telephone & Telegraph Apparatus of Merit

Department 67

Young & McCombs

L. P. BEST PRES.
ROCK ISLAND, ILL.

DISTRIBUTORS FOR

DeForest Radio Telephone & Telegraph Co.

Wm. J. Murdock Co. Amrad Products

Perfection Radio Co.

and all prominent manufacturers

IMMEDIATE DELIVERIES

Young & McCombs

L. P. BEST PRES.
ROCK ISLAND, ILL.

"The Big Store On The Corner"

In its many years of business in Rock Island, Illinois, this institution has been noted for its fair dealings to its patrons. In opening its wireless department, managed by seasoned veterans in the wireless field, the staid policy of this institution has been applied as it has in each of our 77 departments of the retail business. It is our earnest endeavor to render at all times the utmost in Quality, Service, and Courtesy.

We hereby extend you a cordial invitation to visit us whenever you are in our vicinity, and assure you of our appreciation of the opportunity to make your personal acquaintance.

Distributors of

RADIO TELEPHONE and TELEGRAPH APPARATUS OF MERIT

Immediate deliveries on all products of
The de Forest Radio Tel. & Tel. Co.
Perfection Radio Co. Wm. J. Murdock Co.
American Radio & Research Co.
and all prominent and reliable manufacturers.

"If it's cheap—regardless of quality—we do not handle it."

THE apparatus illustrated and listed in this catalog has been designed with great care by skilled radio engineers, and it is guaranteed electrically and mechanically perfect.

It is the aim of this company to sell radio apparatus of only unquestionable quality and efficiency.

The prices we list here are the same as offered by the various manufacturers of this quality apparatus, and in no instance can you purchase at a lower price from them or other dealers.

All apparatus is carefully tested and inspected before shipment to you.

We assure you of immediate deliveries of all de Forest, Murdock, Amrad, Perfection, and Vacuum valve products. In no instance do we list an item in this catalog unless a substantial stock of same is on hand.

It is our earnest desire to please you, and be deserving of your patronage and re-orders. Address all correspondence to Dept. 67, Young & McCombs, Rock Island, Illinois.

WE GUARANTEE

That every article in this catalog is exactly as described and illustrated, and that the instruments are built in accordance with correct mechanical and electrical principles by skilled workmen.

We guarantee that the instruments purchased from us will satisfy you perfectly and that they represent full value for the price you pay.

We have rated our apparatus conservatively, as it is impossible to guarantee the range of radio apparatus.

If for any reason you are dissatisfied with any instrument purchased from us, return it, and we will replace it with exactly what you want or refund your money.

Young & McCombs

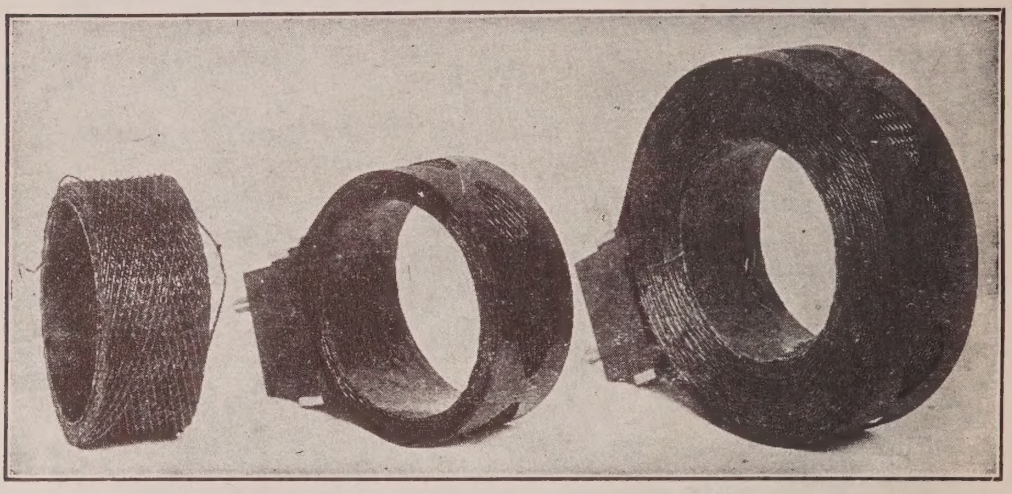
Department 67 Rock Island, Illinois

Manufacturers, Jobbers and Retailers

of

RADIO APPARATUS OF MERIT

Type L Honeycomb Wound Inductance Coils



The de Forest Honeycomb Coils embody a new idea in radio coil design that is almost revolutionary, in that it makes the usual large and cumbersome cylindrical and multi-layer coils obsolete, and replaces the customary type of coil that is now used. Each inductance is mounted on a plug designed to be used in connection with our type LC coil mountings. They may be used as tuning, loading, and wave-meter coils, as well as loose-coupler coils.

The de Forest honeycomb wound inductances are to be used exactly like any other radio inductances having a fixed value. They differ from inductances usually employed in radio telegraphy, in that instead of having the inefficient taps connected to cumbersome switches, each coil is provided with a plug which fits into a receptacle in the coil mounting, which takes the place of the loose-coupler. Condensers, in series or parallel with the coils, provide means of tuning the circuit to the given wave length. Different size coils being used for longer wave lengths. In this way the losses due to dead-ends and high resistance taps are done away with.

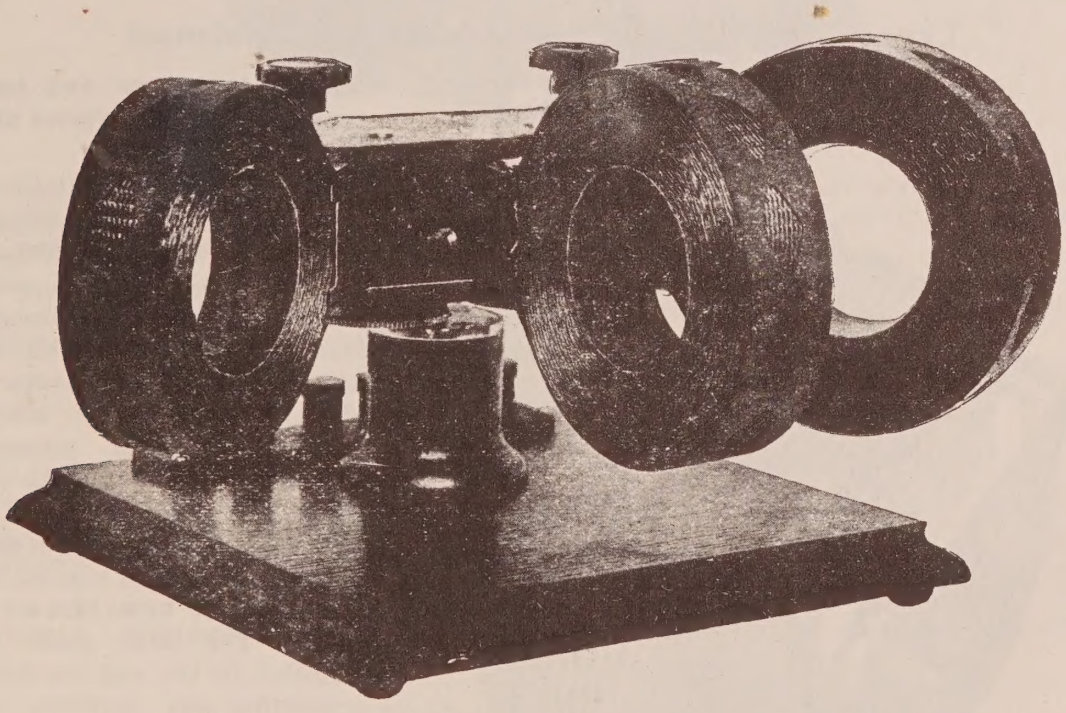
de Forest Honeycomb Wound Inductance Coils

Catalog No.	Milhenries Inductance	App. Wave-length Range In Meters		Price Mounted On Plug	Shipping Weight In Lbs.
L- 25	.040	130	375 meter	$1.40	1½
L- 35	.075	180	515 meter	1.45	1½
L- 50	.15	240	730 meter	1.52	1½
L- 75	.3	330	1030 meter	1.60	1½
L- 100	.6	450	1460 meter	1.70	2
L- 150	1.3	660	2200 meter	1.80	2
L- 200	2.3	930	2850 meter	1.90	2
L- 250	4.5	1300	4000 meter	2.00	2
L- 300	6.5	1550	4800 meter	2.10	2
L- 400	11.	2050	6300 meter	2.25	2
L- 500	20.	3000	8500 meter	2.40	2
L- 600	40.	4000	12000 meter	2.65	2½
L- 750	65.	5000	15000 meter	2.80	2½
L-1000	100.	6200	19000 meter	3.00	2½
L-1250	125.	7000	21000 meter	3.35	2½
L-1500	175.	8200	25000 meter	3.60	2½

An Ideal Honeycomb Coil Assortment

1	L- 25	Honeycomb Coil	$1.40	$ 1.40
1	L- 35	Honeycomb Coil	1.45	1.45
1	L- 75	Honeycomb Coil	1.60	1.60
2	L- 100	Honeycomb Coils	1.70	3.40
2	L- 250	Honeycomb Coils	2.00	4.00
3	L- 600	Honeycomb Coils	2.65	7.95
3	L-1250	Honeycomb Coils	3.35	10.05
		Total		$29.85
1	LC-101	Triple Inductance Mounting		12.00
				$41.85

The above ideal honeycomb assortment and LC-101 Inductance Coil Mounting offers the experimenter the most advanced type of loose coupler the market affords. A tuner or coupler that will respond efficiently to all wave lengths from 130 meters to 21000 meters. This range covers practically all damped or undamped wave stations now in existence.



Inductance Coil Mountings

The mounting consists of a three-plug receptacle fastened to a bakelite framework mounted on a pedestal, which is in turn fastened to a base. They are designed to hold the L type honeycomb coils. The center receptacle is fixed, and the outer receptacles are variable by the knobs and gears. It is intended for use with two primaries and one secondary (balance circuit), or in any other of many circuits the operator may desire.

No. LC-101 Mounting as illustrated, on oak base.

Price, $12.00 Shipping weight, 4 lbs.

No. LC-100 Same as above, but without base or pedestal.

Price, $9.00 Shipping weight, 3 lbs.

Dust-Proof Galena Detector

This is the same detector as illustrated on page 9 of this catalog, differing only in that it is mounted on a heavy formica base 2½″x2″x⅜″, on which there are also mounted two heavy binding posts. This detector, equipped with a sensitive galena crystal, makes a very handy thing to have when your vacuum valve burns out.

No. D-101 Crystal Detector.

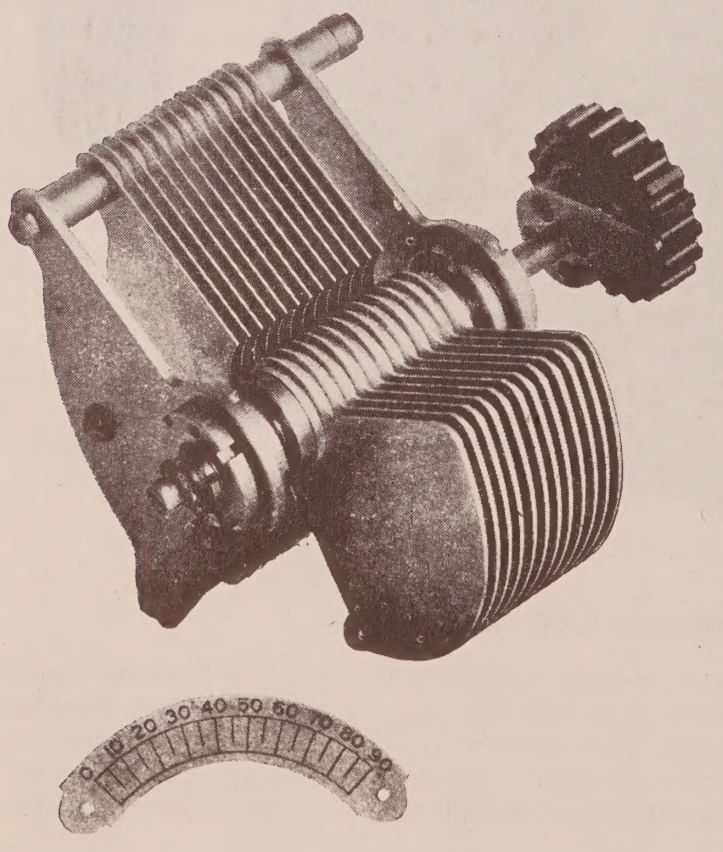
Price, $2.60 Shipping weight, 1 lb.

Anti-Capacity Key Switch

Recommended for use as a master switch from crystal to audion detector. It is a three-position switch, which will replace a switch of the four-pole, double throw type. Consists of a telephone lever, to which is fastened a cylinder of bakelite containing four contact blocks. Mounted on each block are three phosphor bronze contact clips, which mesh with wire contact fingers. Perfect contact is maintained at all times. Suitable for panel mounting.

No. S-200 Price, $2.75 Shipping weight, 1 lb.

Type CV-500 90-Degree Variable Air Condenser



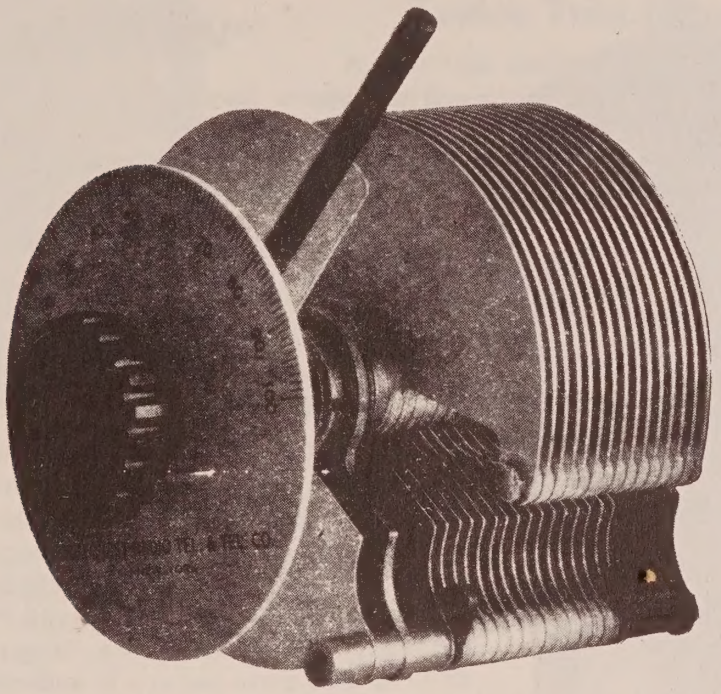
This is a new and improved design in variable air condensers.

The 13 aluminum stationary plates are held together by two brass end plates, through which rods are passed. The spacers are of aluminum. On the shaft is mounted 12 aluminum rotary plates, separated by extra large spacers to prevent change in location, and, as an additional precaution, are held together in one corner by a sustaining rod similar to those for the stationary plates. The large shaft is pigtailed to the end washer, preventing any variation in resistance, due to improper contact, and is insulated from the end plates by hard rubber bushings, held in place rigidly by threaded washers. Constant tension is maintained by a spring washer, and is adjustable through the bearing in the bottom end. The capacity is .0005 mfd. Over all dimensions, 4⅝″ high, 3¼″ wide, 3¾″ long.

No. CV-500, including knob, scale and pointer.....Price, $5.25

Shipping weight, 2 lbs.

De Forest Vernier Type Condensers



The above illustration shows the type CV-1003 vernier plate variable air condenser. The vernier attachment admits of one plate adjustment, which is a very desirable feature when tuning undamped wave signals.

This condenser is similar in construction to the CV-500 condenser, but differing from it in that it has an 80-degree swing, is equipped with vernier plate, and has a white celluloid disk 100 division scale.

This type condenser can be had in any of the following styles. The shipping weights are approximately 5 lbs.

CV-1000	.001 mfd.—Unmounted, without vernier	$12.40
CV-1003	.001 mfd.—Unmounted, with vernier	14.25
CV-1010	.001 mfd.—In glass case, without vernier	17.50
CV-1013	.001 mfd.—In glass case, with vernier	19.50
CV-1500	.0015 mfd.—Unmounted, without vernier	14.00
CV-1503	.0015 mfd.—Unmounted, with vernier	15.60
CV-1510	.0015 mfd.—In glass case, without vernier	19.00
CV-1513	.0015 mfd.—In glass case, with vernier	20.60

Variable Grid Leak

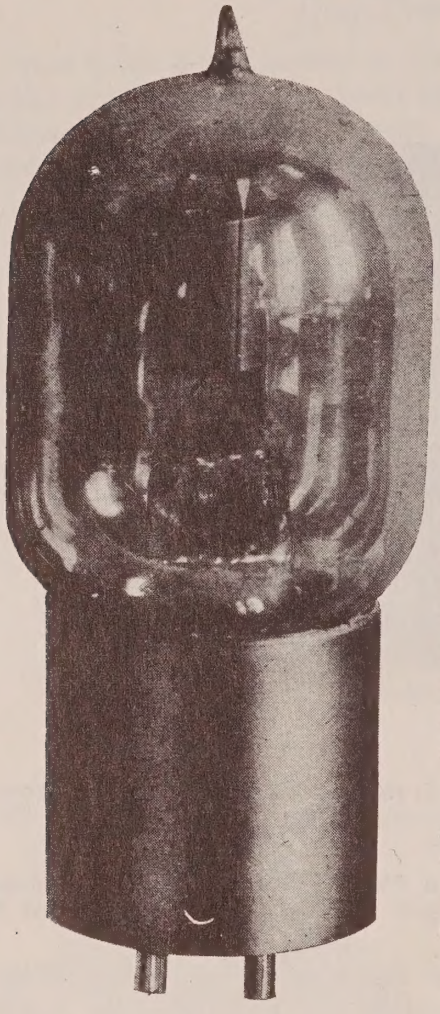
The grid leak consists of a small insulating panel about the size of a half dollar. It is of the pencil mark type and can be easily varied by use of a pencil and eraser. Connection is made to the pencil mark by two screws which are held in place by nuts. The complete leak is covered by a nickel plated cover. Ready to mount on any panel.

No. G-100 Price, 75c Shipped prepaid.

Amplifying Transformer

An audio-frequency amplifying transformer of the very greatest electrical and mechanical efficiency. Amplifies the original signal from 100 to 200 times. It is an iron core, two winding, closed core transformer.

No. A-200 Price, $7.00 Shipping weight, 3 lbs.



"VT" Audion

This tube is identical with the latest forms of tubes manufactured by the de Forest Co. for war work, and is similar in shape to the VT-21 tube used by the Signal Corps during the war.

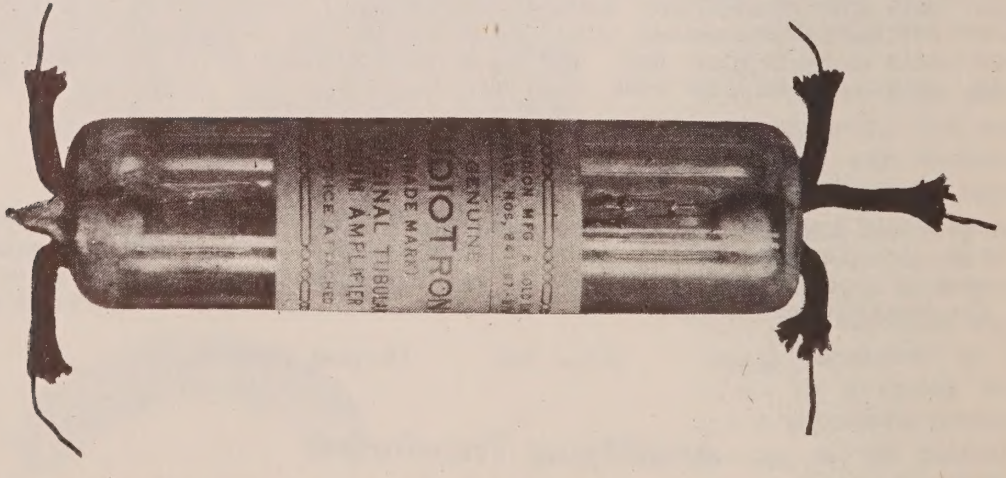
It consists of a highly evacuated vessel enclosing the three elements—grid, plate and filament. The plate is of nickel and surrounds a helical grid, also of nickel. The filament is crimped tungsten wire, passing through the center of the grid, as it did in the old type T de Forest bulb.

The chief difference between this tube and the type T bulb is in the degree of evacuation. The old type T bulb was of the gaseous type, more or less unstable, and required a variable "B" battery. The new "VT" tube is exhausted to a very high vacuum, so that it will stand very high plate potentials. When used as a detector, however, a 20 to 40-volt plate battery is sufficient. This voltage is not critical, and fixed battery may be used.

The filament takes from .7 to .8 amps. only, about half of the T type bulb. This bulb is provided with a four-prong base, suitable for the standard bayonet socket.

de Forest "VT" Audion.....Price, $7.00

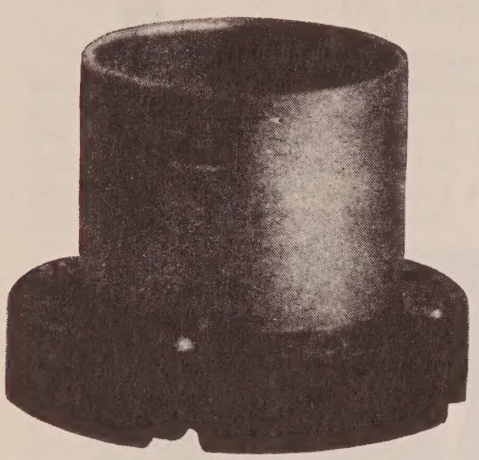
The Original Tubular Vacuum Amplifier



A genuine audion manufactured and sold under the de Forest patents, Nos. 841387-879532.

(2 filaments)

Shipped prepaid.....Price, $6.00



Audion Tube Receptacle

A neat type audion tube socket of the bayonet type, designed for mounting on the front of a panel or on a table top. Connecting screws from the four contact springs are brought out through the bakelite base to the front, making it both a back and front connected type. It is designed to take the standard 4-prong bases of any transmitting or receiving tubes on the market.

No. R-300 Receptacle

Price, $1.50 Shipping weight, ½ lb.

DeForest Test Buzzer

An exceptionally fine buzzer for wave meters, crystal detectors testing, code practice, or laboratory work. Gives a beautiful smooth note of constant amplitude throughout the total range of audio frequencies. Two adjustments assuring absolute constancy in action. Will run on one dry cell.

Price, $2.00 Shipped prepaid

"Liberty" Head Receivers

A radio head telephone set designed and built to meet the requirements of radio operators for sensitiveness, audibility, ruggedness, reliability and comfort.

A strictly quality set, superior to the customary "fine cheap" sets.

Type HPF-100	3200 Ohms., per pair	$14.00
Type HPF-101	2200 Ohms, per pair	12.50

Brandes "Superior" Type Head Receivers

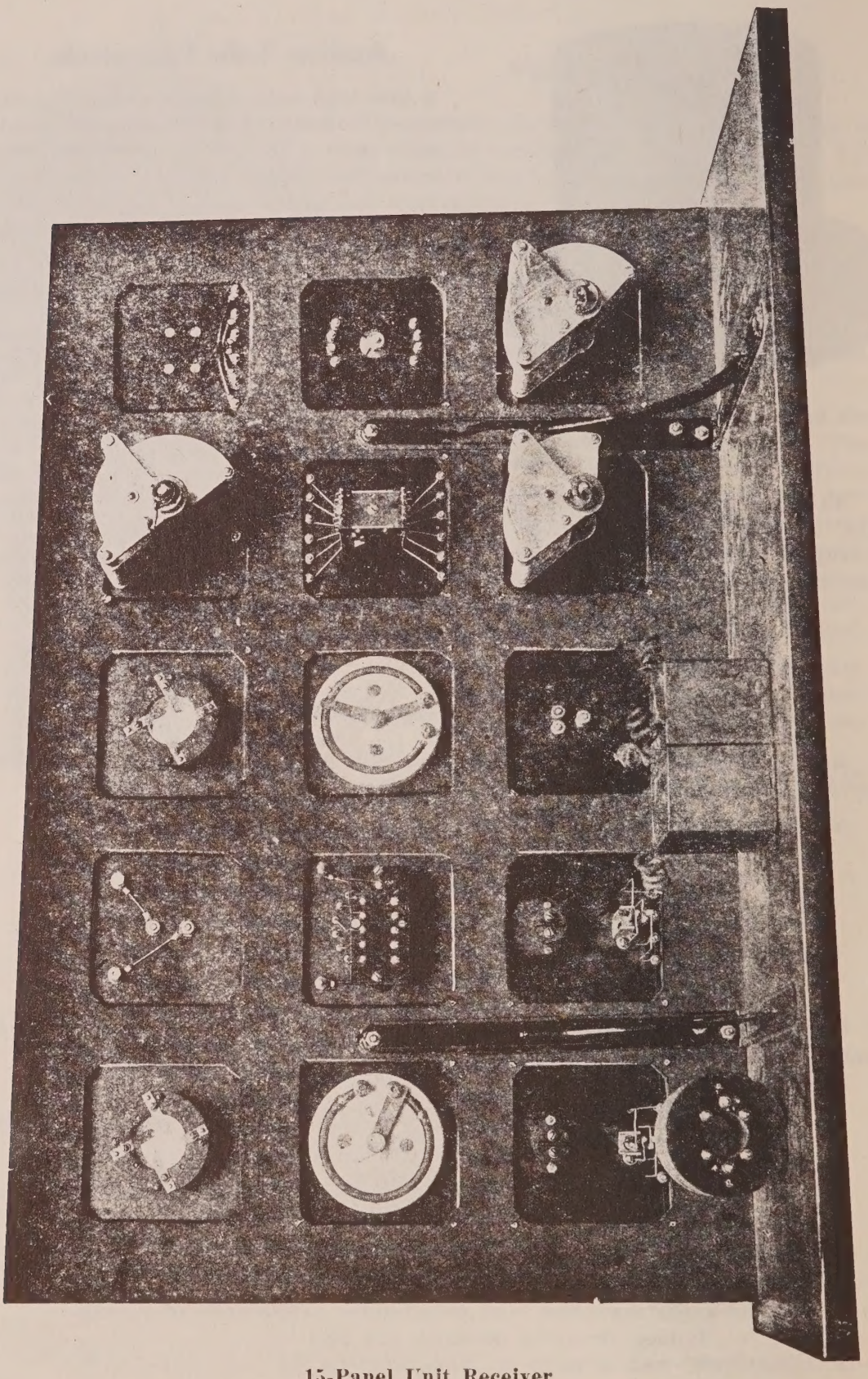
Light and rigid in construction, case of aluminum, interior parts nickel plated and highly polished, caps of hard rubber.

Furnished complete with rubber-covered metal head band and silk cord.

No. HPB-700 Price, $7.00 Shipping weight, 2 lbs.

Materials

D-9	Unmounted knobs of bakelite, 1½″ diam.	$ .15
D-10	Unmounted knobs of bakelite, 1″ diam.	.12
D-12	Bakelite knobs assembled with self-cleaning switch arms of phosphor bronze, including bushings and nuts	.72
D-13	Heavy brass binding posts	.12
D-16	Head bands without phones, leather covered	.75
D-17	Single gang pull switches	.30
D-31	Formica panels, ⅜″ thick x 7⅞″ square	1.60



15-Panel Unit Receiver

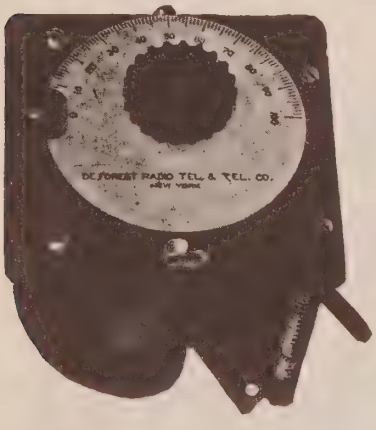
Rear view of a typical de Forest "15 Panel Unit Receiving Set." It is a complete tuner, with a wave length from 150 to 25,000 meters, and has crystal and audion detectors, with one step amplifier.

De Forest Unit Receiving Set

The de Forest Unit Receiving Set is a distinctly original idea in receiving apparatus for experimenters, students, amateurs and others, who desire to put their apparatus together in their own way. It is offered as a solution to the problems of the many who, though limited in means, wish to buy accurately designed, up-to-date and efficient apparatus and use their ingenuity in its assembly without having to pay for the expensive assembly and costly cabinets, without which such apparatus could not be bought in the past.

The set consists of parts and controls, each one of which is mounted on a small bakelite panel 4½″ square and $\frac{3}{16}$″ thick. These panels are provided with holes in the four corners for screwing to a latticed or cut-out back-board of wood, or, preferably, of a wall-board, such as Compo-Board. In order to make up a complete panel receiver of the unit type, it is only necessary for the purchaser to cut holes 4″ square in the back-board, mount the units over these holes and connect the apparatus together in the back of the panel, using any circuit he may prefer. The wiring is simplicity itself, as each unit is provided with connecting screws, and a troublesome soldering iron is not necessary. The connecting screw feature will be appreciated, also, when it is desired to change the circuit to meet new requirements or for any particular test.

The amateur with limited means may start by purchasing a coil, crystal detector and condenser. These, connected together, will form a receiver to which he may add at a later date other coils and condensers to make his original set more selective and efficient. It can be readily seen that this feature of the Unit Set is extremely valuable to the amateur, in that he, instead of discarding the apparatus that he previously bought, adds to it to produce better and more efficient results. This obviates the necessity of buying small, cheap tuners and other apparatus to which alone the amateur has had access previously, and provides him with parts of the highest quality only. This expansion idea produces a receiving set which is entirely flexible in use and should last a life time, throughout which it can be adapted, by the addition of other devices, to all improvements in the art of radio telegraphy and telephony.

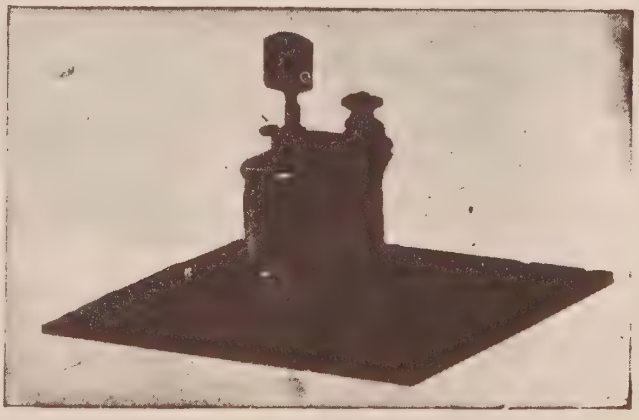


This illustrates the standard CV-1000 and CV-1500 vernier air condensers described elsewhere in this catalog, but mounted on a unit panel.

UCV-1500	On Unit Panel, without vernier	$14.90
UCV-1503	On Unit Panel, with vernier	16.75
UCV-1000	On Unit Panel, without vernier	13.60
UCV-1003	On Unit Panel, with vernier	15.50

UCV-1500 type is .0015 mfd. capacity, while UCV-1000 type is only .001 mfd. capacity.

Unit Panel Detector

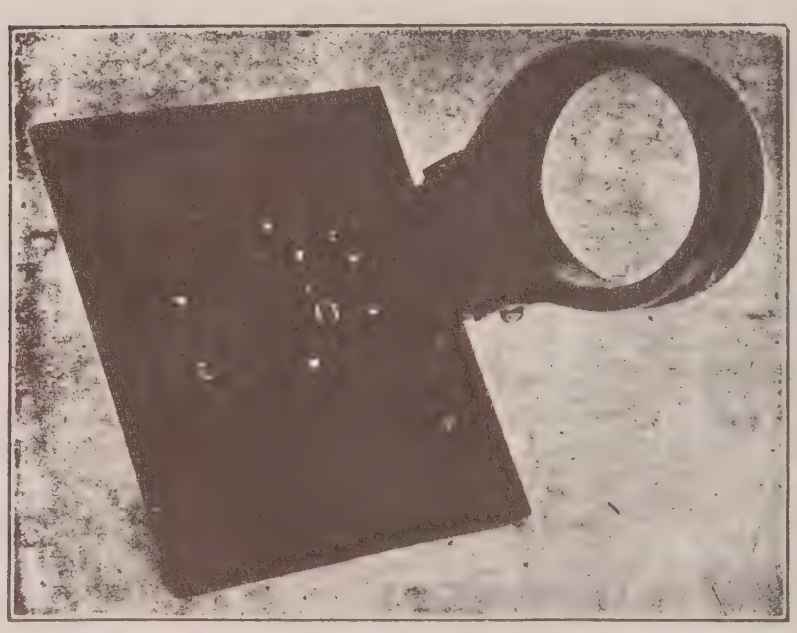


This detector is the same as the type D-100 crystal detector, only mounted on a unit panel.

No. UD-100

Price, $4.00 Shipping wt., 2 lbs.

Unit Coil Mountings



A mounting for two honeycomb coils. Consists of a brass angle piece holding two receptacles which move on bearings, so that the coupling between the coil inserted in them can be changed at will. Brass angle piece is nickeled. Receptacles are of bakelite. The whole is mounted on a unit panel and the plugs are connected to four binding screws by heavy Litz, covered by super-fibre tubing.

No. ULC-300
Price, $4.30
Shipping weight, 2 lbs.

Unit set style of the type LC-100 coil mounting, described on a previous page. For the unit set, this differs in that it is mounted on a standard unit panel of bakelite, and is provided with six connecting screws on the back of the panel instead of with binding posts and base.

No. ULC-100 Price, $10.00 Shipping weight, 3 lbs.

This is identical with type ULC-300 mounting, except that it is equipped with receptacles for three honeycomb coils instead of two. It should not be confused with the ULC-100 coil mounting, as it is not equipped with the gears and pinions of the ULC-100.

No. ULC-400 Price, $5.30 Shipping weight, 3 lbs.

Primary Condenser Switch

A double switch comprising two switch arms and eight contact points, designed for switching the primary condenser from a series to a parallel connection, so that the primary condenser of the usual size for short wave work will still be of use on the very long waves.

The switch is made up of laminated phosphor bronze contact springs fastened to a standard 1½" bakelite knob. The ends of these springs are turned over at an angle so as to give a clean wiping contact that is always positive. Contact springs and contact points are nickel-plated, and the latter are furnished with connecting nuts and washers in the rear of the panel.

No. US-100 Condenser switch for unit set

Price, $2.00 Shipping weight, 1 lb.

Variable Air Condenser On Unit Panel

This condenser is the same as the No. CV-500 90-degree condenser, described on page 3. It is, however, mounted on a standard unit set bakelite panel. This condenser may be used as a secondary or primary condenser, or with a grid leak mounted on the panel, it makes an ideal condenser for the grid circuit of the audion.

No. U-100 Condenser and grid leak

Price, $7.50 Shipping weight, 3 lbs.

No. UCV-500 Condenser only on panel

Price, $6.75 Shipping weight, 3 lbs.

Anti-Capacity Switch On Unit Panel

The type S-200 anti-capacity four-pole double throw switch can be obtained already mounted on one of the unit panels. For a detailed description of this switch see page 3. Mounted on the standard unit panel, it is provided with all necessary connecting screws on the back of the panel.

No. US-200 Price, $4.00 Shipping weight, 3 lbs.

"A" Battery Switch and Telephone Jack Panel

This unit panel is provided with an "A" battery switch and telephone jack receptacle. This provides means for controlling the audion battery and offers a suitable and convenient means for connecting the telephones to the receiving set. When an amplifier is used and two of these jacks, a quick change over from single audion to amplifier is accomplished.

No. U-200

Price, $2.95 Shipping weight, 2 lbs.

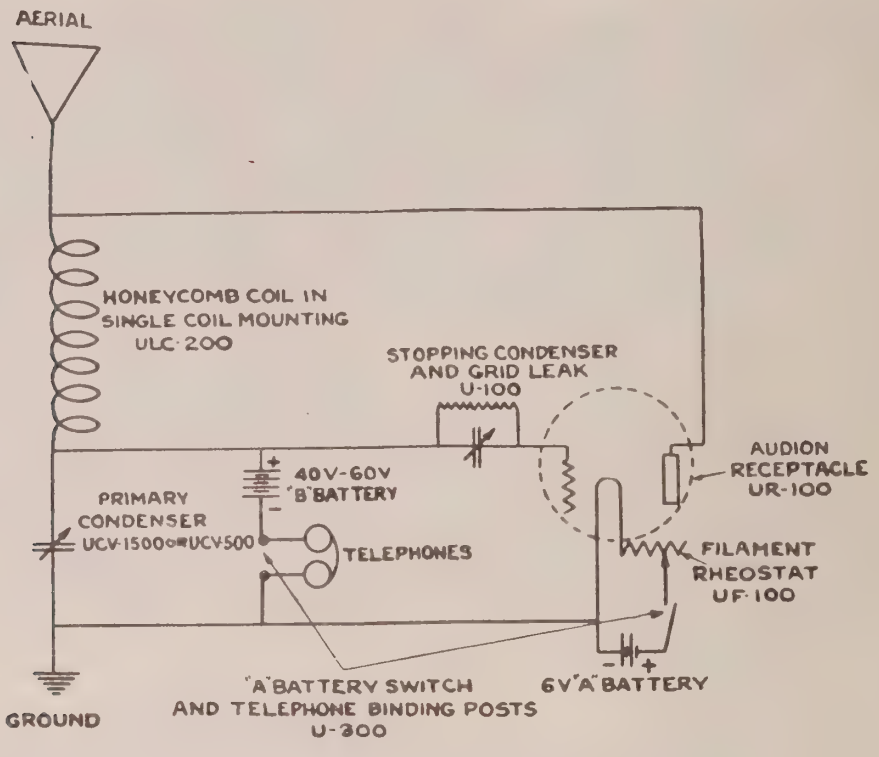
"A" Battery Switch and Binding Posts

The same panel as above, but with two hard rubber binding posts instead of telephone jack.

No. U-300

Price, $2.00 Shipping weight, 1 lb.

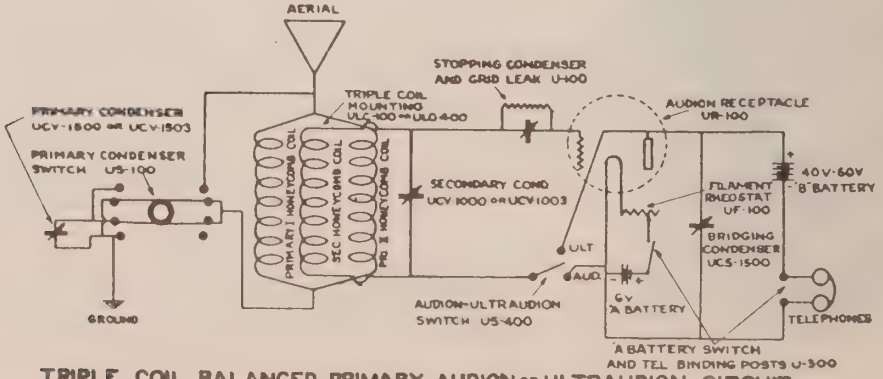
Single Coil Ultra-Audion Set



1	No. ULC-200	Single coil mounting	$ 1.90
1	No. U-100	Grid condenser and leak	7.50
1	No. UR-100	Audion tube receptacle	2.95
1	No. UF-200	Filament rheostat	3.80
1	No. U-300	"A" battery switch and telephone binding posts	2.00
1	No. UCV-500	Variable condenser, .0015 mfd.	6.75
		Total	$24.90

(The above instruments are all mounted on unit bakelite panels, as are all the suggested sets listed on this and adjoining pages.)

Triple Coil Ten-Panel Unit Set



TRIPLE COIL BALANCED PRIMARY AUDION or ULTRAUDION CIRCUIT

Audion Tube Receptacle

This is the same receptacle for VT tubes as is described on page 6, but is mounted on the standard unit bakelite panel for use in connection with the panel type receiving sets.

No. UR-100 Receptacle on panel

Price, $2.95 Shipping weight, 2 lbs.

Filament Battery Rheostat On Panel

This instrument consists of the standard porcelain battery rheostat mounted on the unit bakelite panel for use in the unit receiving sets. A large 1½″ bakelite knob and pointer give a highly finished appearance to the front side.

No. UF-200 Rheostat

Price, $3.80 Shipping weight, 2 lbs.

"B" Battery Switch

For those experimenters using the old style audion bulbs requiring a variable "B" battery we can supply a 9-point switch mounted on the standard unit bakelite panel.

No. US-500 Price, $3.00 Shipping weight, 1 lb.

Beginners' Unit Set of 3 Panels

The following unit sets are suggested for the selection of the purchaser. The tabulated costs cover everything required, with the exception of batteries, head receivers, audion tubes and honeycomb coils.

1	No. ULC-200	Single coil mounting	$1.90
1	No. UD-100	Crystal detector	4.00
1	No. UCV-500	Variable air condenser	6.75
		Total	$12.65

The above are all mounted on standard unit panels.

Honeycomb Coils Suggested for Beginners' Unit Set

1	L- 35	145 to 280 meters wave length	$1.45
1	L-100	430 to 790 meters wave length	1.70
1	L-200	845 to 1570 meters wave length	1.90
1	L-400	1850 to 3300 meters wave length	2.25
		Total cost	$7.30

Triple Coil Unit Set of 15 Panels

The typical 15-panel unit set illustrated on page 7, where a rear view is shown, comprises a triple coil tuner with a wave length range of 150-25,000 meters, crystal and audion detectors, and a one-step amplifier. It is the same as our Triple Coil 10-Panel Unit Set, with the addition of a crystal detector and a one-step amplifier. If desired, further steps of amplification may be added at $16.70 each, to make this set even more sensitive than it is as shown.

It is suggested, as an added improvement, that vernier condensers instead of the type listed here, be substituted. This permits a reduction in the number of honeycomb coils used.

The circuit used in the 15-panel set is illustrated on the next page. This uses the balanced primary two-coil circuit. Many other connections will suggest themselves to the experimenter, in place of the two-coil primary.

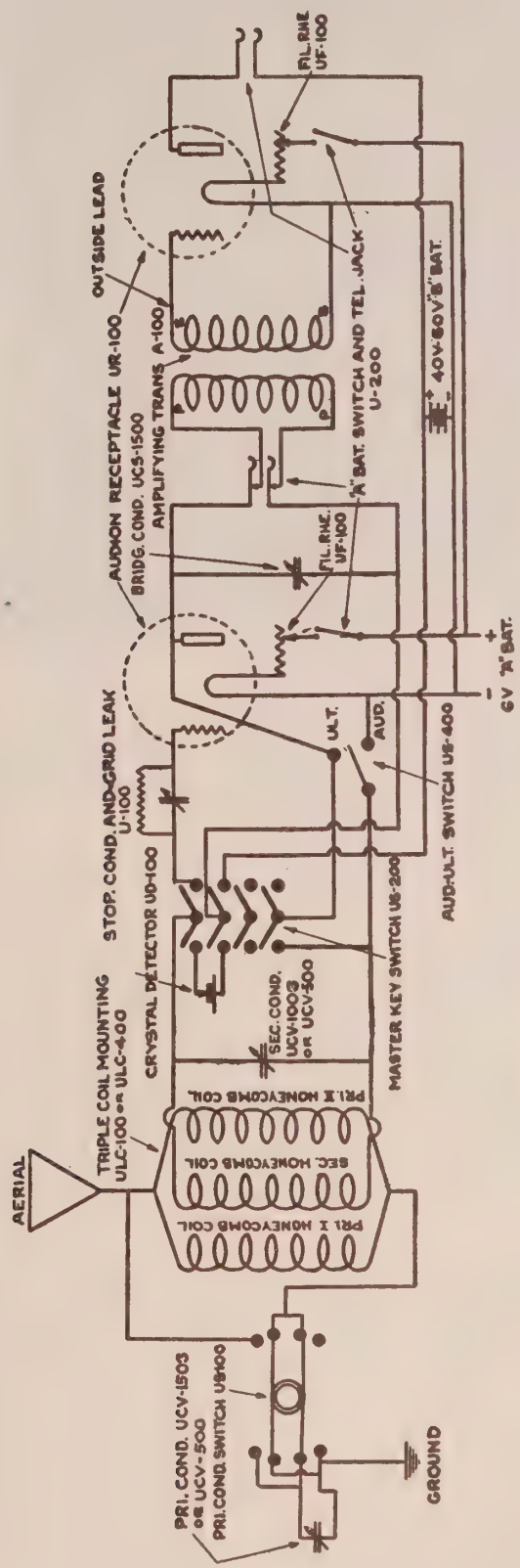
15-Panel Units Cost

1	No. ULC-100	Triple coil mounting	$10.00
1	No. US-100	Primary condenser switch	2.40
2	No. UCV-500	Variables for primary and secondary uses @ $6.75 each	13.50
1	No. US-200	Master anti-capacity switch	4.00
1	No. U-100	Variable grid condenser and leak	7.50
2	No. UR-100	Audion tube receptacles for detector and amplifier @ $2.95	5.90
2	No. UF-200	Filament rheostats @, 3.80	7.60
1	No. USC-1500	Bridging condenser	5.75
1	No. US-400	Audion-Ultraudion switch	2.20
1	No. UD-100	Crystal detector	4.00
2	No. U-200	"A" battery switches and telephone jacks @ $2.95	5.90
1	No. J-100	Telephone plug for jacks	1.10
1	No. A-200	Amplifying transformer	7.00
2	No. 766	"B" battery units, 20-v each	6.00
		Total	$82.85
2	"VT" audion tubes @ $7.00		14.00
		Total	$96.85

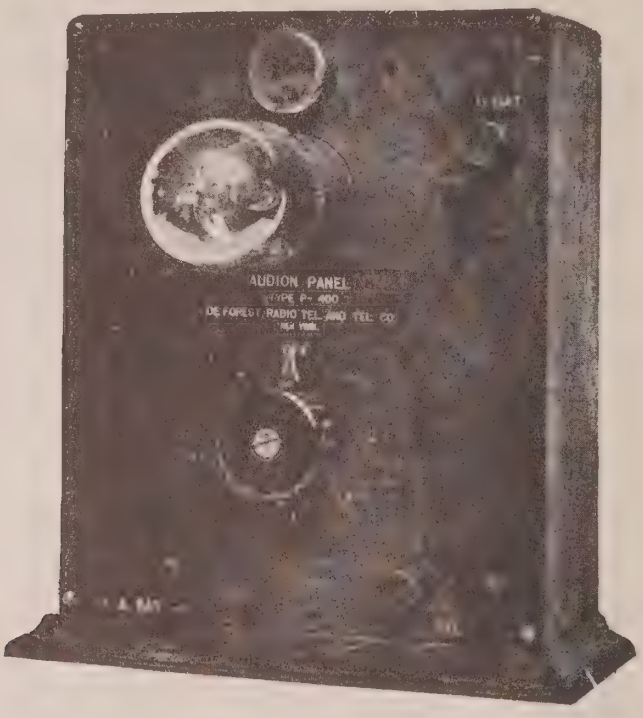
Triple Coil Unit Set of 10 Panels

This unit set comprises the new differential primary circuit and the Audion-Ultraudion secondary of the double coil set. It is the last word in sensitiveness, flexibility of control, and selectivity on undamped and damped waves. The two fields of the primary coils, opposing one another, makes the circuit remarkably anti-static and ultra-selective.

1	No. ULC-100	Adjustable triple coil mounting	$10.00
1	No. US-100	Primary condenser switch	2.40
1	No. UCV-1503	Primary vernier condenser	16.75
1	No. UCV-1003	Secondary vernier condenser	15.50
1	No. U-100	Variable grid condenser and leak	7.50
1	No. US-400	Audion-Ultraudion switch	2.20
1	No. UR-100	Audion tube receptacle	2.95
1	No. UF-200	Filament rheostat	3.80
1	No. U-300	"A" battery switch and telephone posts	2.00
1	No. USC-1500	Bridging condenser	5.75
		Total	$68.85



15 PANEL TYPICAL UNIT SET CIRCUIT



The illustration shows our typical P-400 line of audion panels. They are all equipped with standard grid leaks, rheostats, heavy rubber binding posts, and standard VT tube receptacles. By using the new adapters the gas audiotron bulbs my be used instead of the "VT" bulb. Beautiful engraved and grained genuine bakelite panels are used on all models. In the cabinet models, beautiful "Early English" finished quarter-sawed oak cases are used.

Type RS-100 Jeweler's Time Receiver

We are carrying in stock at all times a complete receiving set designed for use as a time receiving set for jewelers. While it is primarily designed to receive signals from Arlington, W. Va., we can supply the proper honeycomb coil for receiving time signals from the Illinois Watch Co. for jewelers located in the middle west. In fact, by the interchanging of coils, any radio signals may be received from the many spark stations located in this country, providing a proper aerial is erected.

No. RS-100 Jeweler's time receiver
(Supplied with "B" battery and coil, but no tube or "A" battery.)
Price, $27.80 Shipping weight, 15 lbs.
(Complete circular, giving detailed description of the time receiver, will be mailed upon request.)

Type P-400 Audion Panel.—Consists of tube receptacle, grid leak and condenser, rheostat and binding posts for connection to tuner and "A" and "B" batteries. No cabinet and "B" batteries are supplied.
Price, $10.90 Shipping weight, 6 lbs.

Type P-401 Audion Panel.—Same as above, but with "Early English" finished oak cabinet.
Price, $13.25 Shipping weight, 7 lbs.

Type P-402 Audion Panel.—Larger panel and supplied with a 40-volt "B" battery in a 7½″ x 7⅛″ cabinet.
Price, $21.00 Shipping weight, 13 lbs.

Type P-500 Audion-Ultraudion Panel.—This is similar to the P-402 panel, but with two switches for audion-ultraudion connection, and either 20-volt or 40-volt "B" battery in cabinet.
Price, $24.00 Shipping weight. 13 lbs.

(All the above apparatus is sold without tubes, which are priced separately at $7.00.)

Series P-100, P-200, P-300 Audion Control and Amplifier Panels

Audion Control Panel, Type P-100

A new type of audion control, remarkably flexible in its applications, designed for our standard 4-prong audion tube. May be used with any tuner as a detector or oscillator, and by a slight change in connections it becomes a one-step amplifier, which can be used in connection with a crystal detector or another audion control panel. It is especially designed for commercial and laboratory use where a variety of circuits for different tests are desired.

The panel and case, as well as the "B" batteries and amplifying coil, are identical with those of our P-200 two-step amplifier and P-300 combination audion ultraudion and one-step amplifier. A system of small self-cleaning switches with laminated switch arms and segmental, rather than pig-tail, connections provides an easy and immediate method of altering the circuit to any desired condition. Six pairs of binding posts are provided, each marked for the proper connection. In the upper left hand corner are the two "INPUT" binding posts connected to the primary of the amplifying coil, which is our standard type A-200, described in this catalog. In the upper right hand corner are four binding posts, two of which are marked "RA" and "RE." These should be connected to the tuner when the apparatus is used as a detector or oscillator. When the panel is used as an amplifier these two binding posts are connected to the two other binding posts adjacent to them by means of nickel-plated straps. This connects the secondary of the amplifying coil to the grid and filament of the tube.

The switch in the upper left hand side, marked "GRID CONDENSER," short circuits the grid condenser and grid leak when the apparatus is used as an amplifier. Just below this switch is one marked "TICKLER." This is designed to short circuit the two binding posts at the bottom of the panel, marked "TICKLER," when it is desired to use the panel with an ultraudion connection.

On the upper right hand side is a switch marked "B" battery. This allows of using either 20 or 40 volts of the "B" battery, with which the outfit is equipped. The remaining switch below this one throws the panel from the audion to an ultraudion connection.

Below the four switches are mounted the stopping and bridging condensers. These are our step-by-step type, and are of the proper maximum capacity graded from a small minimum. The three sets of binding posts at the bottom of the panel are for connection to the receiving telephones, the "A" battery and the "TICKLER" coil.

The binding posts are of moulded dielecto, with the new slotted feature for holding the connecting wires firmly.

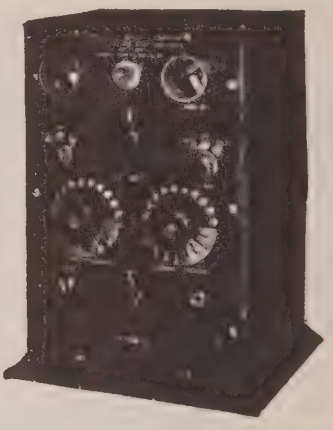
The audion tube receptacle is our standard type R-100 with a nickel-plated finish.

The four control switches are provided with 1″ bakelite knobs, and the stopping and bridging condensers are equipped with our standard 1½″ bakelite knobs. These condenser switches are of the improved fan type, which insure positive contact and practically no leakage.

The self-contained "B" batteries are mounted on a framework which is removable and allows full access to the rear of the panel in case any trouble should arise or the operator should wish to change the circuit. The amplifying coil is mounted on the false bottom and is connected to the panel by macaroni covered wire.

The panel is of highly grained bakelite dielecto and the cabinet has our standard "Early English" finish. All parts on the panel are nickel-plated, so that the complete instrument is finely finished throughout.

No. P-100 Price without tubes, $67.50 Shipping weight, 35 lbs.



The two illustrations shown here are of the P-100 Audion Control Panel and the type P-300 Combination Audion-Ultraudion and One-Step Amplifier.

P-100 Audion Control Panel is shown to the left, and a detailed description of same will be found on the preceding page.

P-300 is shown to the right, and a description of it will be found on page 18.

Type P-200 Two-Step Amplifier

This is our very latest in amplifier design, and will be found to be very different and so much more efficient than our older types of amplifiers that there is no comparison. The most notable feature of the new design is its compactness. The small case contains not only the amplifying coils, telephone jacks, amplifier tube receptacles, and filament resistances, but also a "B" battery of 40 volts, which is sufficient to give amplifications up to 300 times. All these pieces of apparatus are mounted on the panel and come out with it. The panel is easily removable, making all parts most accessible, and the replacing of the "B" batteries is but a moment's work.

The amplifying coils are of our A-200 type and are so mounted that there is no field interference between them, thus preventing "squeal" when the second step is used. The filament rheostats are of our design (type F-200), providing smooth running and closely variable adjustments, a description of which will be found under our catalog No. UF-200.

The amplifying tube receptacles are of the type UR-100. Small resistances wound on bakelite forms are placed in the negative filament lead of the second tube to keep its grid negative to the proper amount, and thus take advantage of the full amplifying power of the tube without blocking.

Three telephone jacks near the bottom of the panel are provided for connection to the receiving telephones.

The panel is of ⅜" bakelite, beautifully engraved. The tube receptacles are nickel-plated. The knobs and binding posts are of bakelite. The binding posts are provided with slots to hold the wire in place while the head is being screwed down. This is a new feature which, though but a detail, should be highly appreciated when many connections are made.

In order to operate the instrument it is only necessary to connect a six-volt storage battery to the two binding posts marked "A BATTERY." The source of audio frequency should be connected to the two posts marked "INPUT." If the plug on the telephone cord is then inserted in the jack marked "I TEL," the audio frequency to which the device is connected will be received unamplified. If, then, the plug is inserted in the jack "II TEL" and the filament rheostat marked "FILAMENT TUBE I" is adjusted, the audio frequency will be amplified by means of the first step. If a similar operation is performed with the rheostat for the second tube after the telephone plug is inserted in the jack marked "III TEL," the full amplifying power of the instrument will be obtained.

No. P-200 Price without amplifying tubes and "A" battery, $69.50
Measurements, 12½" x 9⅜" x 7¾" Shipping weight, 35 lbs.

Type P-300 Combination Audion-Ultraudion and One-Step Amplifier

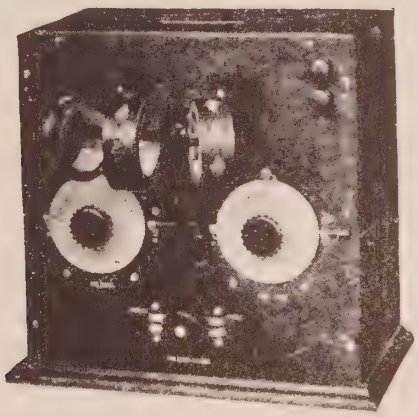
The P-300 was designed to fill the crying need for a combination detector and amplifier in the average amateur or commercial radio receiving station. Unlike our type P-100 Audion Control Panel, this panel is equipped with sockets for two tubes, so that the detector and amplifier can be used at the same time. Although the type P-100 Control Panel can be used as an amplifier, it must be used either as a detector or amplifier, but cannot be used as a combination instrument without the addition of another audion tube.

The type P-300 combination instrument is built similar to our types P-100 panel throughout. The same materials and parts are mounted on the same size panel, which goes in the same size case. The "B" batteries are of the standard type described with our P-200 instrument, assuring long life. The panel is of beautifully grained bakelite, handsomely engraved. The knobs and controls are of bakelite and the metal parts are of brass, with a fine nickel polish.

The instrument consists of 2 No. R-300 Audion Receptacles, 2 No. F-200 Filament Rheostats, 2 No. 12 three-point Switches, 1 No. CS-1500 Stopping Condenser, 1 No. CS-3000 Bridging Condenser, 1 G-100 Grid Leak, 2 Telephone Jacks, and 4 Bakelite Covered Binding Posts. The design of these parts, together with the materials used, may be ascertained by referring to them in the catalog under their respective catalog numbers.

Since the illustration was made, this panel has been equipped with two binding posts with short-circuiting strap for a tickler connection, in order that it may be used with the typical regenerative tuning circuits, with which amateurs are familiar.

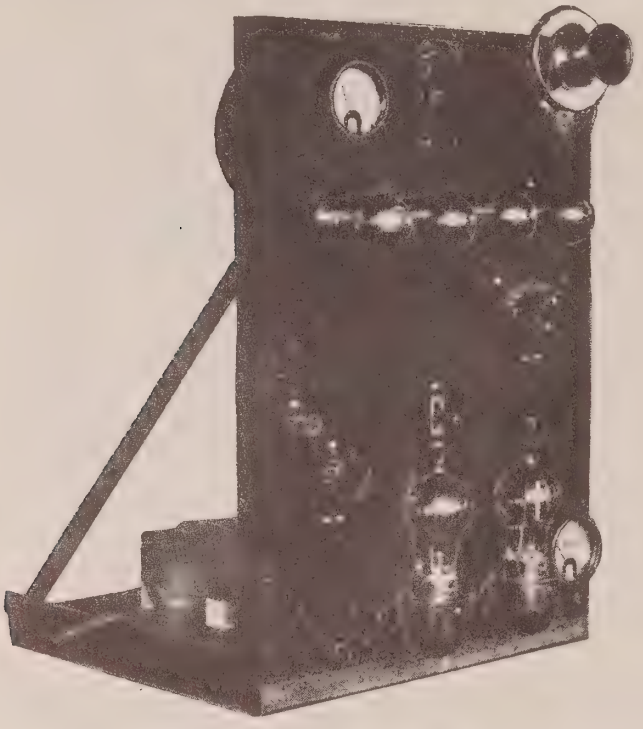
T-200 Balanced Primary Circuit Multi-wave Tuner



This is a new tuner of most excellent design and remarkable efficiency. It consists of a type LC-100 triple adjustable coil mounting, a type CV-1503 vernier tuning condenser, a type CV-1003 secondary vernier tuning condenser, and a type US-100 primary condenser switch mounted on a handsomely engraved bakelite panel. It is wired with heavy copper wire in super-fibre sleeving, and the primary circuits are kept well apart from the secondary circuits in order to cut down capacity effects. The complete tuner is mounted in an oak cabinet with the de Forest "Early English" finish. Metal parts are nickel-plated, with a high polish. Standard bakelite binding posts with the new slotted feature are provided for connection to the aerial, ground and the audion control panel, or crystal detector.

Dimensions of cabinet, 13″ wide, 18″ deep, 12¾″ high. When used with our P-300 Combination Audion-Ultraudion Detector and One-Step Amplifier Panel a complete receiver of extreme sensitiveness, selectivity and beauty is provided.

Type T-200 Balance primary circuit multi-wave tuner without coils
Shipping weight, 35 lbs.
Price $77.50



The transmitter illustrated here is now in use at our experimental station, 9BY, and remarkable results have been attained with it. Verified reports show that our phonograph concerts and speech have been heard regularly at Savanna, Ill. (61 miles from Rock Island); Clinton, Iowa (38 miles); Maquoketa, Iowa (43 miles); Galesburg, Ill. (50 miles); Marengo, Iowa (90 miles). For our regular working schedule see a following page.

The de Forest A. C. Radio Telephone and Telegraph Oscillion Transmitter, Type O

Although the de Forest A. C. Oscillion Transmitter is something entirely new on the market, it has been so carefully designed and so well constructed that it is already a practical instrument which may be relied upon to give excellent service over short ranges.

The operation of the instrument could not be simpler. All that is necessary is to connect the power leads of the set to the ordinary house lighting circuit, connect antenna and ground to the terminals of the set, push a button and talk.

No Troublesome Adjustments

The set needs to be adjusted but once. This may be done when it is installed, and once these adjustments have been made it will need no further attention. Absolutely no knowledge of radio telephony is necessary to successfully operate the set, and the non-technical man can run it just as well as the most up-to-date radio engineer. It is as simple in operation as the ordinary house telephone.

Electrically Operated Antenna Switch

One of the advantages of this radio telephone which will be duly appreciated by those who have had experience with the older types is the remote control system, by which the antenna is automatically connected to either the transmitter or receiver by merely pushing a button. This is a feature, the value of which can be appreciated most after the instrument has been in use.

The telephone is designed primarily for 200 meter transmission, but sets can be furnished to operate on other wave lengths at a slightly increased price.

One 6-volt storage battery is needed in connection with the telephone to operate the microphone and the remote control relay. Any standard storage battery will be satisfactory for this work.

Using this radio telephone in conjunction with receiving equipment furnished by us, ranges of ten to twenty miles and over may be reliably covered with a moderate sized antenna, although distances up to forty miles have been reported by owners.

The panel on which the apparatus is mounted is of bakelite, 14″ x 20″. It sets on an oak base 14″ x 15″, so that the complete set occupies a minimum of space. At the top of the panel is mounted a microphone transmitter of the usual type on an arm, to the right and left of which is located the plate circuit milliammeter and the filament ammeters, respectively. A small key switch in the center of the panel switches the latter instrument from the oscillating circuit to the rectifier circuit, so that the filaments of the tubes in either circuit may be adjusted to the proper current values.

Receptacles for the four oscillating tubes are located directly below the microphone. These receptacles take the de Forest VT audion bulb, which is provided with a four-prong base and fits into the receptacle with a bayonet lock. This is a decided advantage, since if a tube burns out it may be instantly replaced without having to make connection to binding posts, etc., by means of flexible leads, as in the old fashion. On the right hand side of the panel below the tubes is located the tuning condenser and receiver. This post represents the aerial receiver connection, and the other side of the receiver is connected directly to the ground.

Near the bottom of the panel on the right and left are mounted the filament rheostats. One of these controls the filaments of the four oscillating tubes, and the other those of the rectifying tubes at the bottom of he panel. A one-ampere scale hot wire ammeter is located to the right at the bottom of the panel for reading the high frequency current output in the aerial circuit. This instrument is connected with the ground lead and there is no danger of a shock should anyone come in contact with it. At the bottom of the panel are located binding posts for connecting with 110 V. A. C. circuit, a 6 V. storage battery for the microphone, the key for telegraphing and the ground connection. Connection to the aerial is made by means of a binding post mounted to the right of the panel at the top.

On the back of the panel is mounted the helix (the inductance of which is variable by means of a contact clip), modulation transformer, tuning condensers, filament rheostats, filament switch and condensers. On the baseboard in the rear is mounted a special transformer which contains three windings, in addition to the input winding which is connected with the alternating current source. One of these windings supplies the high potential for the plate circuit of the oscillator, and the other two, the low potential filament currents.

The panel is mounted on the baseboard by means of japanned iron brackets, providing a most stable mounting. The wiring is of heavy wire, highly insulated, and connections are soldered after the wires are formed into shape, so that there is practically no chance of a break or loose connection. The set is made up in every respect with the same class of materials and workmanship as that with which our larger and more expensive transmitting apparatus is manufactured.

The absence of the usual motor generator set, with its customary noise and troublesome oiling, etc., is particularly noticeable and should be especially appreciated by those who have previously used such sets. Also the absence of the customary wiring from the motor generator set, control panel and other accessory apparatus is particularly desirable. The new transmitter is clean-cut in every respect, since its design has been boiled down to that of a most practicable piece of apparatus, simple and "fool-proof," far more serviceable than the ordinary radio telegraph transmitter. No effort or expense has been spared to make this instrument just what its name implies—a **telephone** transmitter for genuine service, and not a toy. It is the very latest word in radio apparatus. It is already meeting with a wide-spread demand.

Price, including tubes, $260.00

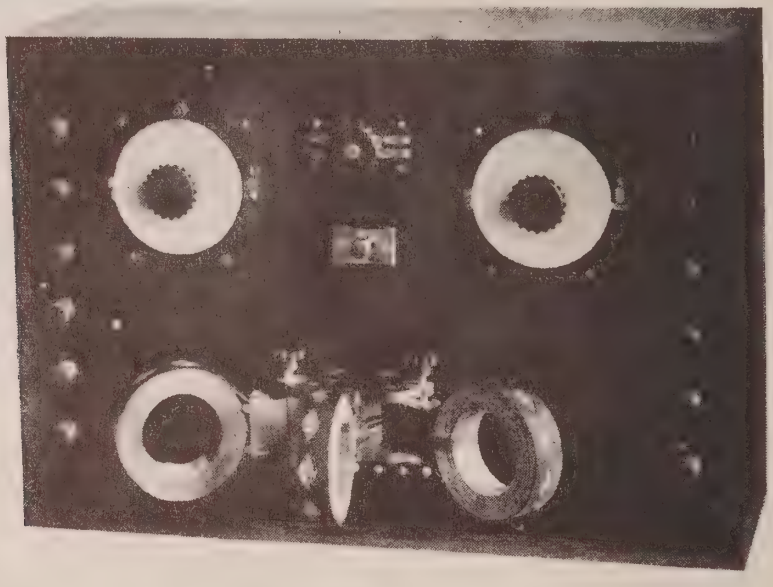
Type OT-10 D. C. Radiophone

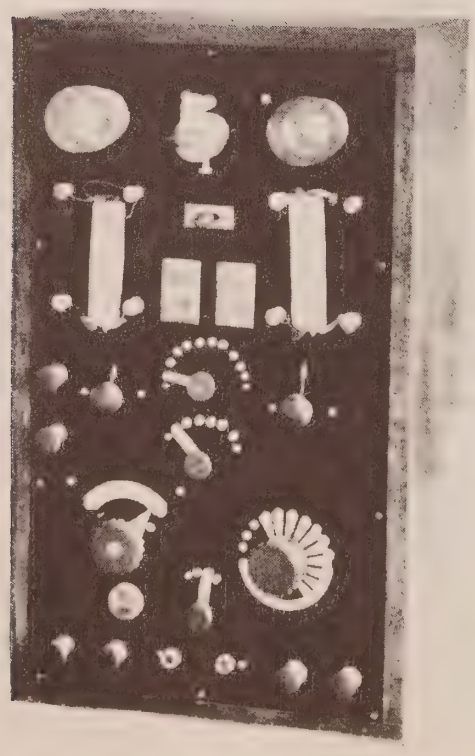
Where only D. C. current is available we furnish the above set equipped with a dynamotor for 32 or 110 volts direct current supply. Can be plugged in standard lamp socket and works as efficiently as the A. C. set.

Price, with tubes, $325.00

Besides the instruments of de Forest manufacture listed herein, we beg to advise that we can furnish any instrument listed in the de Forest Co. regular catalog. This catalog will be mailed you upon the receipt of 10 cents in stamps. It gives a detailed description of every instrument, as well as a host of good "hook-ups" that may be used on any receiving set. We are ready to make immediate deliveries on all their goods, as well as those of the Wm. J. Murdock Co., the Perfection Radio Co., Amrad products, Multi-Audi-Fone, and many others.

Tuner and Control Panel at 9BY

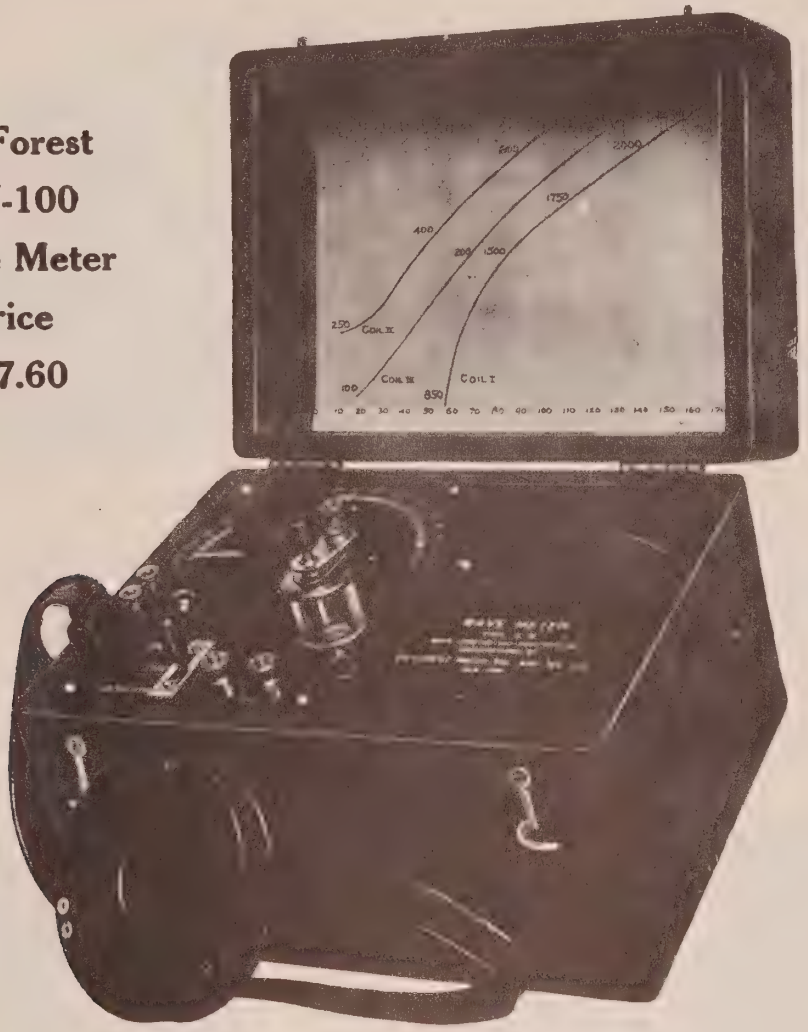




The illustrations shown here are of the receiving set used in our test station. The cabinet above consists of a tuner suitable for undamped and damped wave signals, with a range from 100 m. to 21,000 meters. Provision has been made for connecting any make tuner in the circuit for testing purposes and comparison of the honeycomb coupler, which is of the de Forest make.

To the left is shown the audion-ultraudion and amplifier control cabinet. Provision has been made for both the bayonet and type T tubes. A stand-by crystal detector is shown between the two VT tubes, which can be instantly thrown into the circuit by means of the master anti-capacity switch. All the instruments used in this receiver are of de Forest manufacture, and the design of panel, manufacture of same, and mounting was completed in our work-shops.

De Forest
SW-100
Wave Meter
Price
$57.60



Construction Department

We are fully equipped to design or construct any type panel transmitter or receiver according to your own specifications. You are fully protected as to patent rights, as we use only such instruments in our construction and assembly as are licensed for experimental use and upon which all royalties have been paid. Advise us as to your needs and we would be pleased to submit estimates. If you already own some instruments and wish them incorporated in a panel set, we are in position to mount them for you satisfactorily at a nominal charge.

We carry in stock a complete supply of rheostats, switches, contacts, binding posts, and accessories suitable for the construction of audion control and amplifier panels, receiving sets, and transmitters. Write us for quotations for parts or complete materials for the construction of sets and we will be pleased to submit specifications and estimates. This department is under the supervision of an ex-navy operator, who is fully competent to give you suggestions and advice regarding the most suitable apparatus.

Test Stations

9BY—Our Type-O A. C. Radiophone and Telegraph Transmitter operates on 200 and 250 meters. Phonograph music and speech is sent out every Thursday evening between 7 p. m. and 9:30 p. m. A ten-minute intermission at 8 and 9 p. m. to allow for the reception of 9ZS and NAA time signals and weather report.

9BC—Our 1 K. W. Rotary-quench Spark Set operates on 200 meters. This station is open for relay work and will receive messages from amateurs on this wave length any evening, except Saturdays and Sundays, between the hours of 7 p. m. and 9:30 p. m. For special tests at other hours, write for appointment.

Knock-Down Audion Panel

These unassembled parts for an audion control panel are the same as those used on the audion panel described on the previous page. All necessary parts for the complete audion are packed ready for assembly. Panel is drilled accurately.

Price, $10.00 Shipping weight, 3 lbs.

Perfection Binding Posts

The illustration shows the full size of the Perfection Hard Rubber Binding Posts. They have a hard rubber top, with a highly nickel-plated base. Either nickel or brass finish can be supplied in any quantity.

Priced, 6 for 75 cents, or 12 for $1.25, plus postage

Nickel-Plated Switch Points

	Doz.	100	1000
¾-inch x ¼-inch, tapped 6-32	$ .30	$2.50	$18.75
¼-inch x 5/16-inch, tapped 6-32	.40	3.00	22.50

Automatic Tension Switches

Nickel-plated, high-grade 60c

Your Choice of the
200-Meter Regenerative Tuner
3,000-Meter Arlington Tuner
20,000-Meter Long Wave Tuner
All models priced at
$15.00 each

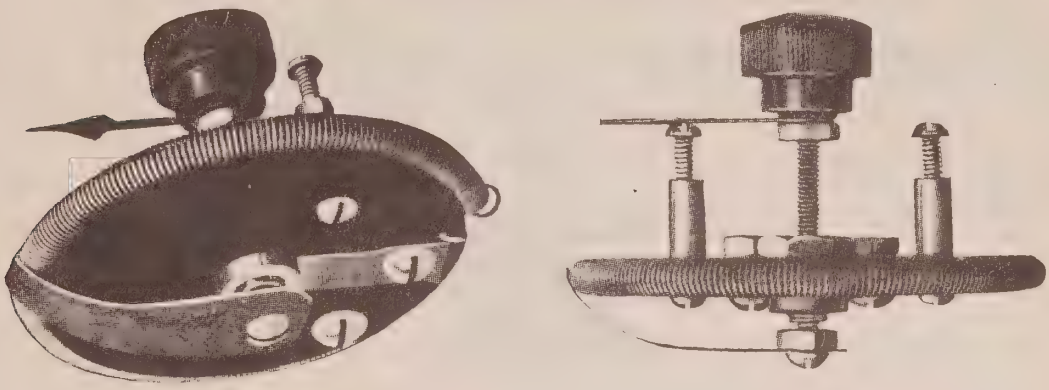
BS—Type—20,000 Meter Long Wave Coupler. A revolutionary design. Equally efficient on LOOP aerials, Rogers underground or overhead. No tickler coils are used and none needed, as a comparative test will show. Coils are machine wound on the involute curve principal. Five steps on primary and secondary. No capacity effects. Coils are set in a special compound and will work through the heaviest static. Not good for spark stations below 3,500 meters. XDA comes in on first tap and NSS on fourth. You can get all in this hemisphere and get it good. No fine adjustments to make, turn the switch and the tuner is working. Tuner is four and three-quarter inches square by two and one-half inches deep. Formica top with nickel-plated switch and points, and with hard rubber posts. The wiring diagram for this tuner is on the bottom, and you can't lose it.

CS—Type—200 Meter Regenerative Tuner, with primary, secondary, and tickler coil. P and S, ten taps each. No coupling is needed, as the tickler coil sets at an angle determined as the most efficient. Coils machine wound involute, then are waxed in, and are fool-proof and damage-proof.

Use any kind of an aerial you want and you will find that the results with these tuners beat anything that you have ever tried. For wireless phone work these tuners can't be beat, as the wave length ranges from 175 to 450 with the amateur aerials.

AS—Type—3,000 Meter Tuner was designed for those who wish to have a complete set of tuners for all the used wave lengths. It is the same size as each of the above, only the windings are different, and has the same number of taps as the type CS. It is not efficient below 600 meters and was not designed to be. With these three tuners you can get all that is in the air. All tuners have highly polished wood bases that may be removed if you want to set them in a panel set. Rubber feet are included.

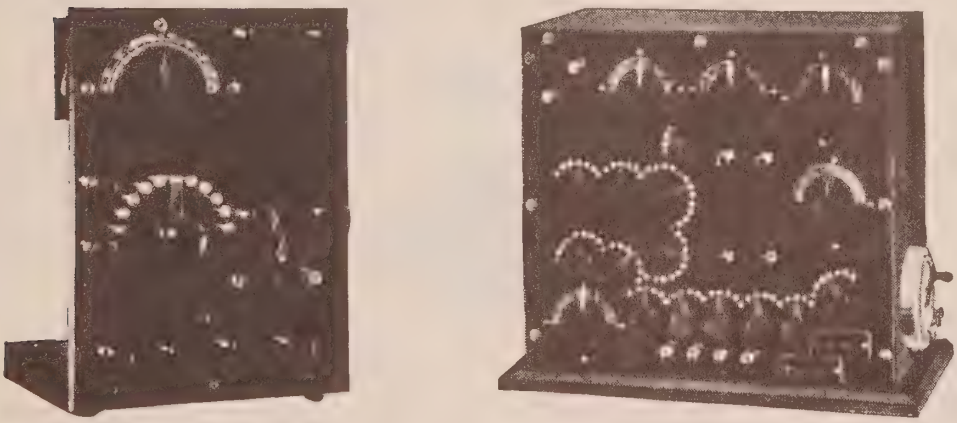
Perfection Panel Mounting Rheostat



This is the type rheostat you have all been waiting for. Throw out your old one and use the new, as the holes are even drilled the same place for mounting. The disc is of turned formica and wound with ten ohms of high-grade resistance wire. Nickel-plated mounting screws and clock hand pointer. Has a definite off position, eliminating the usual extra battery switch. It is the smoothest running rheostat made and will last a life time.

Price, $1.50 Add 4 cents for mailing charges

Perfection Universal Receiving Cabinet



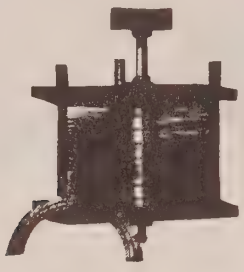
The cabinet of this remarkable receiving set is of fine quality hardwood, with piano finish. The panel is flush mounted and of formica. Either VT or Audiotron mounting is furnished. Suitable for undamped and damped wave reception, as it is equipped with all-three of the famous perfection tuners, with suitable cut-in switches. All customary bulb regulators, condensers and binding posts are of the highest quality.

Prices upon application.

The new Perfection Audion Panel surpasses any similar instrument now offered on the market. Mounted on hardwood baseboard, with rubber feet, it presents an appearance that will improve any station. All parts are mounted on a 6″ x 8″ formica panel. Complete with variable grid condenser, 9-point "B" battery switch, either audiotron or VT receptacles, Perfection panel rheostat, and hard rubber top binding posts. All connected ready for use. Furnished and priced without bulb.

Price, $16.00 Shipping weight, 3 lbs.

Perfection Knock-Down Variable Condensers
41, 21, 11 Plate Sizes

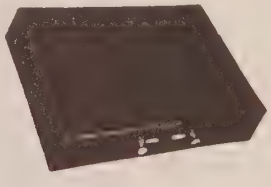


Knocked Down Condensers. Shipped in neat, strong box, with full instructions. For panel sets. Cut shows completed condenser of 43 plates. Hard rubber knobs, brass graduated 180-degree scales, clock hand pointer, formica tops and bottoms drilled in a jig. A thing of beauty and a joy forever. Connections must be soldered. The 11-plate just the size for the grid circuit. Thousands in use.

41-plate, knocked down, capacity .001 M. F., delivered to you.....$2.75
21-plate, knocked down, capacity .0005 M. F., delivered to you..... 2.25
11-plate, knocked down, capacity .00025 M. F., delivered to you..... 1.75

Plates are adjustable, with top and bottom jamb nuts and screws. Assemble yourself and save money.

Perfection Sending Condensers



We are offering a sectional glass plate condenser, fool-proof, unbreakable, and with a safety spark gap—to prevent breaking the plates from violent high frequency surges.

If you should ever be unlucky enough to break a plate, the cost of fixing it is about 10 cents.

Our condensers have seven high-grade photo plates, sixe 5″ x 7″. There are six special shaped leadfoil fillers, with high frequency cable which taps to binding posts on top of box. Plates are securely taped and dipped in paraffine, but easy to remove without destroying the condenser. Box is made of ¼-inch hardwood, special treated, and will stand rough treatment, as plates are protected at end with corrugated paper.

Boxes are 1¾″ x 5½″ x 7½″ and will fit in any rack for moulded condensers. Capacity of these condensers is .0015 M. F., and each one is tested to 15,000 volts. We recommend six of them in series, parallel, for a 1 K. W. 200 meter outfit.

One of these condensers is the right capacity for a 2-inch spark coil. Boxes are furnished in mahogany oil stain. Just as efficient as any oil condenser, and easier to handle. Price, $2.00.

Materials and Parts

For that Crystal Detector use Arlington Tested Minerals only. The usefulness of a good crystal detector for stand-by purposes is often lessened by an inferior piece of mineral. We handle only **Arlington tested** crystals.

High-grade silicon, per oz.	$ .50
High-grade galena, per oz.	.50
Arco gragal (extremely sensitive and stable)	.50

TELEPHONE PLUG

A standard four-connection telephone plug, suitable for wireless work in changing the phones rapidly from amplifier to receiver. Also for use in single audion work, inasmuch as it affords a way to pull out telephones quickly when sending. This eliminates the necessity of turning out the bulb. With the phones removed there is no danger of paralyzing the receiver.

J-100 Telephone plug $1.10

TELEPHONE JACK

Standard telephone jack, to receive plug J-100. Two of these jacks should be used in an audion one-step amplifier. One inserted in the audion circuit and the other in the amplifier circuit. This enables the operator to facilitate a quick change over if the signals are not loud enough on the first step.

J-200 Telephone jack $1.00

SPECIALS

Standard battery binding posts	$ .04
Copper aerial wire, per lb.	.50
1 MF. fixed condensers	1.00
½ MF. fixed condensers	.75
½-inch spark coils, heavy vibrator	6.10

(Prices on application for larger sizes.)

Standard 110-volt 60-cycle step down transformers, equipped with variable switch for any voltage	3.50
Audiotron adapters, makes the tubular type bulb fit a standard VT socket	1.50

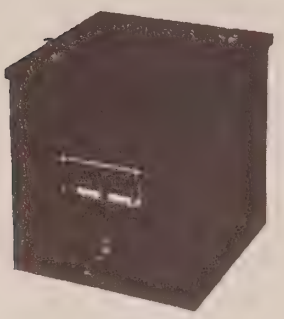
"B" BATTERY—22-VOLT, 4 AMPERES

A marvelous little "B" battery, suitable for the most strenuous use you may care to put it to. It has a capacity of 4 amperes and delivers 22 volts. Two of these units in series will provide the experimenter with the necessary "B" voltage for any type tube.

Price per unit $1.50

UNMOUNTED HONEYCOMB COILS

We are pleased to announce to our patrons that we are now able to offer the famous de Forest type (none equal them) honeycomb coils, in unmounted shape. See price list for honeycomb coils in front pages of this catalog, and deduct 50 cents per coil from regular list prices for unmounted style.



You can measure your wave length with absolute accuracy and no difficulty with the

"AMRAD" Wave Meter

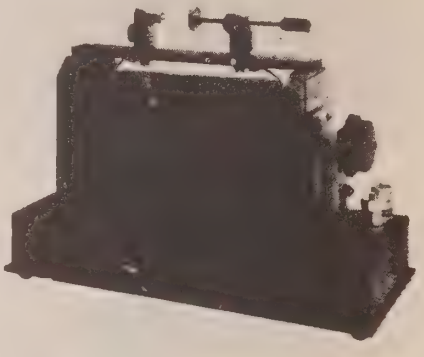
In this very simple and reliable device a flashlight bulb and direct reading dial give instantaneous and precise measurement of your transmitting wave. It does entirely away with danger of violating government rules.

Price of complete wave meter, $6.50

For the amateur who operates where AC current is not available the

"AMRAD" Induction Coil

works as consistently as a transformer.



"AMRO" Induction Coil—Type C

SPECIFICATIONS

Primary voltage	6 volts
(Also designed for use with 32-volt farm lighting current)	
Secondary voltage (open circuit)	50,000 volts
Secondary voltage (load of .002 mfd. condenser)	8,000 volts
Note of vibration	100 cycles
Secondary turns	27,720
Core, $\frac{15}{16}$" diameter of soft Norway iron wires—	
Length	11"
Height	7¾"
Width	4½"
Weight	10 lbs.
Finish	Dark mahogany

FEATURES

This induction coil in its fundamental design is a duplicate of the coil used in trench work in the great war. The only omission is the portable waterproof case. With a single wire antenna only 3 feet above ground, and a counterpoise consisting of two insulated wires laid on the ground, a set containing the "AMRO" coil and a bulb detector will transmit and receive a distance of 15 miles. This makes it an ideal outfit for Boy Scouts, camping parties, and any other occasion where only the simplest type of antenna is available. A much greater distance is possible when used with a grounded inverted "L" antenna. In this latter case an inductive coupled circuit made up of a .002 mfd. capacity condenser (8,000 volts working potential), oscillation transformer, and QUENCHED gap, should be used. The "AMRO" coil will then produce results equal to a transformer equipment of same capacity.

SPARK COIL

The induction coil proper, apparently of the ordinary type construction, is of a very special design.

Secondary. The secondary is carefully built up of small individual coils wound by a patent method which insures uniform electrical stress with maximum mechanical strength. When assembled the entire secondary is cast in wax by a vacuum process, finally being enclosed in a BAKELITE-DILECTO casing.

Primary and Core. The primary is wound on a core formed of soft Norway iron wire. The insulation between the primary and core is waxed cotton tape. Insulation between primary and secondary is XX BAKELITE-DILECTO tubing.

The current in-put to the primary varies from 4 to 16 amperes, depending upon the adjustment of the vibrator and the capacity of the antenna. The current required for normal operation is about 10 amperes. The voltage generated by the secondary on open circuit is approximately 50,000 volts.

VIBRATOR

The consistent performance of the vibrator, which is fitted to the coil, explains the high efficiency of the outfit. It is of the hammer action, double reed type, having a frequency equivalent to 200 sparks per second, and has been operated, keylocked, for 30 minutes without appreciable variation in tone. Cyecium contacts, $\frac{3}{16}$" diameter, insure durability, and the easily adjusted thumbscrew and locknut make for accurate tuning. The vibrator may be removed from the coil as a unit. This is the type of vibrator that has been thoroughly tested and highly endorsed on the battle fields of France.

SPARK GAP

The spark gap is an open type gap, one terminal of which is a flat brass disc, the other a counterbored stud. The length of the gap is adjustable for different capacity antennae and power. When this open gap is used the transmitted wave will have a high decrement, hence it should not be used for anything but short distance field work. For a stationary equipment a quenched gap should be used, because the range will be such as would cause interference with other stations.

CONDENSERS

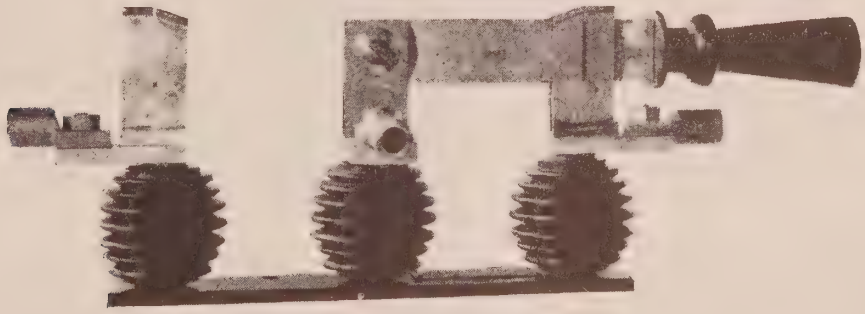
Three 4 mfd. condensers are connected in parallel across the vibrator.

BATTERY

A battery is not supplied with the instrument. A 6-volt automobile storage battery is recommended as the source of power. If a 32-volt lighting circuit is available the special type coil may be used.

PRICE OF
"Amrad" Induction Coil $28.50

"AMRAD" Lightning Switch



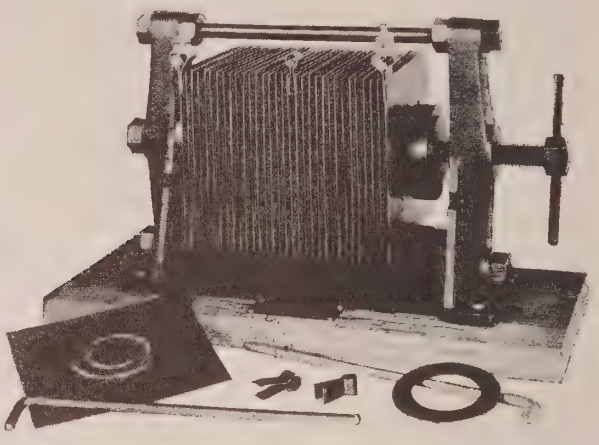
Why have the house in constant danger of lightning? Why not have the aerial serve as a source of protection during heavy electrical storms. A house with an aerial over it, connected to a properly grounded lightning switch, is rarely, if ever, struck by lightning. Too many amateurs neglect this important part of their set, or, more often, connect in a makeshift lightning switch. Put in a switch that conforms with the regulations of the fire underwriters. Such a switch is the Amrad Lightning Switch shown here.

Price, complete, with connecting lugs.....$9.95

"AMRAD" Quenched Gap

240-Spark Note On 60 Cycles With Your Own Transformer

Price $17.50 Complete



SPECIFICATIONS

Height	7″
Length	12″
Width	5″
Weight	11½ lbs.
Maximum Power	500 watts
Voltage	12,500

GENERAL

Adapted from a gap carefully designed for commercial use, the AMRAD Quenched Gap offers the amateur an opportunity to operate his set at maximum efficiency of output. Every care has been taken to insure this product bearing out our commercial reputation both in design and performance.

The AMRAD Quenched Gap gives a lower decrement and a greater amperage in your antenna than a rotary gap. The rapid quenching action stops the oscillations quickly in the primary circuit, thus allowing the secondary or antenna circuit to radiate in its own period and, therefore, on but one wave length. This action also allows closer coupling between the primary and secondary of the oscillation transformer, thus making your transmitter more efficient.

CONSTRUCTION

The AMRAD Quenched Gap consists of THIRTY-TWO specially treated copper discs, making SIXTEEN sparking chambers, held in place by a rugged frame and insulated with Bakelite. Undoubtedly the most essential requisite of a quenched gap is that it should be air tight. If the sparking chambers leak, the gap does not function properly and the surfaces pit and wear out quickly. Air tightness is assured in the AMRAD Quenched Gap by a series of metal spacing rings, which provide uniform pressure over the entire surfaces of the insulating gaskets. Ball points on the compression screws and compression discs aid materially in attaining this desired equal distribution of pressure.

ASSEMBLY

Two steel rods are supplied to assist in the easy assembly of the plates and insulating gaskets. The plates are first stacked on the bakelite strips in the frame. The two steel rods are next inserted through the lower holes in the plates, as shown in the above cut. Fish paper gaskets are next inserted between the sparkling surfaces. The end compression discs are then put in place and the entire set of plates compressed by turning the adjustable compression screw in a clockwise direction. When the gap is compressed to air tightness the two steel rods are withdrawn from the plates and the gap is ready for connection to the radio circuit by means of the two connecting clips supplied.

All parts are interchangeable, a great advantage in making replacements. If desired, the entire set of parts may be ordered and the gap assembled by the purchaser.

To the amateur of moderate means or who contemplates spending only a limited amount upon his wireless equipment, we could not do better than conscientiously recommend the apparatus listed on the following pages.

In its field, among moderate priced equipment, it is vastly superior to most of the products put out to sell at the same or higher prices.

We guarantee every instrument to be mechanically and electrically perfect. Every instrument has received a thorough factory test, and is guaranteed to be precisely as represented in this catalog.

A liberal stock for immediate shipment is always on hand.

And REMEMBER, by placing your order direct with us you are assured of early deliveries, reduced express charges, due to our central location, and the assurance of doing business with an institution with a reputation for fairness in all its dealings.

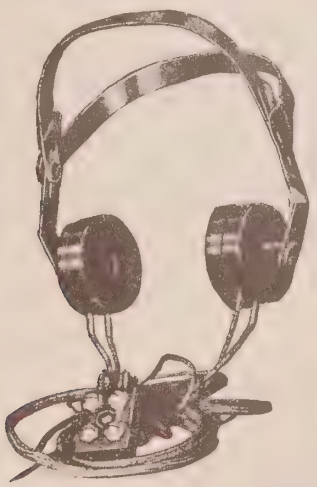
We stand ready at all times to refund your money if the apparatus does not come up to your expectations.

Radio Fifty-Five

Complete double set with total resistances of 2000 or 3000 ohms.; cases, special hard rubber composition, all parts permanently adjusted; magnets, double pole, best quality steel; spool windings, enamel coated copper wire; diaphragms, extra responsive and perfectly seated; cord, five foot length, mercerized finish; head band, nickel-plated spring metal, adjustable to all positions. Real radio receivers in every detail. Weight, complete double set, 14 ounces. Shipping weight, double set, 1¼ lbs.; single set, 1 lb.; receiver only, ½ lb.

Catalog No.		Price Each
55	Complete double set, 2000 ohms	$4.50
	Complete double set, 3000 ohms	5.50
	Complete single set, 1,000 ohms	2.75
	Complete single set, 1500 ohms	2.25
	Single receiver only, 1000 ohms	1.75
	Single receiver only, 1500 ohms	2.25

The Best Receiver Value in the World



In attempting to define the qualities which have made this receiver equipment the most successful low priced radio head set in the world, difficulty is experienced in selecting the proper expression, since the true statement of their remarkable value reads like an over enthusiastic description of 'phones selling for many times their prices. But we cannot go back of the truth, which, plainly stated, to the best of our knowledge, is as follows: There is no better looking, no more sensitive, no more serviceable, no more thoroughly satisfactory set of radio 'phones to be obtained anywhere at such low prices. They are well built. They are very sensitive. They keep on indefinitely delivering full satisfaction.

The very wide sale of this special radio receiver equipment has made possible production in quantities large enough to enable us to affect noticeably the cost of manufacture. The saving is passed on to the buyer in extra value.

Radio Fifty

Bipolar receivers with special processed hard rubber composition cases, all parts permanently adjusted; magnets, highest grade steel; spool windings, enamel coated copper wire; cord, five foot length, silk covered; head band, adjustable, nickel-plated. Weight, double sets, 15 ounces. Shipping weights, double set, 1¼ lbs.; single set, 1 lb.; receiver only, ½ lb.

Catalog No.		Price Each
50	Complete double set, 2000 ohms	$7.50
	Complete double set, 3000 ohms	8.50
	Receiver only, 1000 ohms	3.00
	Receiver only, 1500 ohms	3.50
	Double head band	1.00

Radio Thirty

Similar in essential details to the radio receivers described above. So far as operation is concerned, they will be found very satisfactory. Offered to suit the requirements of those who desire a less expensive equipment. Fitted with serviceable head gear and good quality materials. Shipping weight, receiver only, ½ lb.; single set, 1 lb.; double set, 1¼ lbs.

Catalog No.		Price Each
30	Single receiver only, 1000 ohms	$1.75
	Single receiver with head band and cord	3.00
	Double set, 2000 ohms, complete	5.00
	Single head band, leather covered	.75
	Double head band, leather covered	1.25

Murdock Receivers

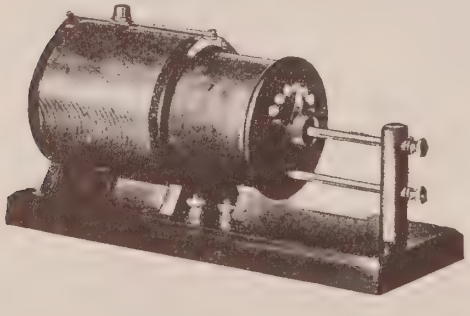
Are as perfect as persistent experiment and long experience in manufacturing can make them.

Because the amount of magnetic material is not decreased in a misdirected effort to obtain exceptionally light weight, Murdock Receivers are more sensitive and more dependable than others.

Because Murdock Receivers are constructed as units with no "floating" or adjustable parts, they stay right all the time, and give lasting, unvarying service.

Because Murdock Receivers are constructed with careful attention to diaphragm thickness, position, and clamping, they give a characteristic strong, unmistakable response, best adapted to the special uses for which they are designed.

Because Murdock Receiver spool windings consist of pure copper wire of highest conductivity, with the very best of enamel insulation, they have more effective turns than receivers with other types of windings, with a consequent increase of efficiency.



Receiving Transformer No. 344

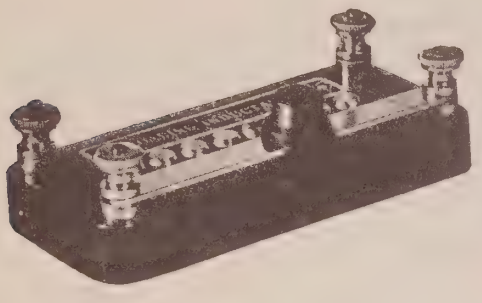
The same in electrical essentials as our No. 341. Differs in constructional details, but will perform with the same unfailing accuracy. Very popular with those who wish to secure a really efficient tuning transformer at a small cost. Shipping weight, 6 lbs.

Catalog No.		Price Each
344	Receiving transformer	$9.00

Tuning Coil No. 240

A well constructed two-slide tuner at a low price. In every detail of construction and workmanship it stands far above the ordinary low priced tuner. May be used with excellent effect as loading inductance in combination with the tuning transformers listed above. Hard rubber composition tube and coil heads. Bare copper wire winding. Nickel-plated metal parts. Shipping weight, 3 lbs.

Catalog No.		Price Each
240	Tuning coil	$4.00



Loading Inductance No. 510

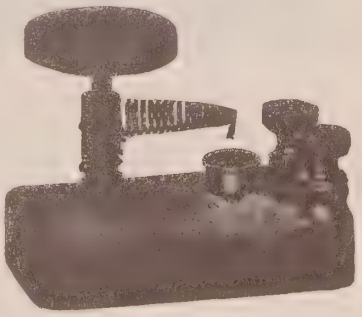
Coils contained in a flat, compact base and tapped to seven active points, each point giving an approximate increase of 400 meters. Moulded hard rubber composition base with nickel-plated metal parts. One of the most popular loading inductances ever offered for amateur use. Shipping weight, ¾ lb.

Catalog No.		Price Each
510	Loading inductance	$4.00

Detector Stand No. 324

A small stand for detector work which is comparable in working efficiency to more expensive instruments. Moulded composition base. Adjustable cup and contact. No element supplied. Shipping weight, ⅓ lb.

Catalog No.		Price Each
324	Detector stand only	$ .70



Fixed Receiving Condenser No. 358

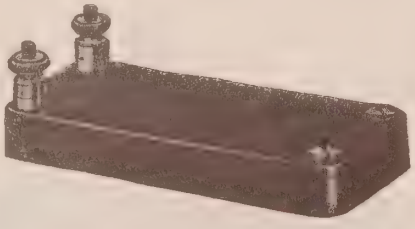
Regulation "stopping" condenser for use in receiving circuits. Composition base with condenser sealed within. Nickel-plated binding posts. Compact, efficient and low priced. Shipping weight, ¼ lb.

Catalog No.		Price Each
358	Fixed receiving condenser	$ .70

Fixed Receiving Condenser No. 359

Similar in general construction to our No. 358 and used in exactly the same way. It is larger in size, and, because of its convenient shape and the screw holes provided, it may easily be adapted to any set. Shipping weight, ½ lb.

Catalog No.		Price Each
359	Fixed receiving condenser	$ .90

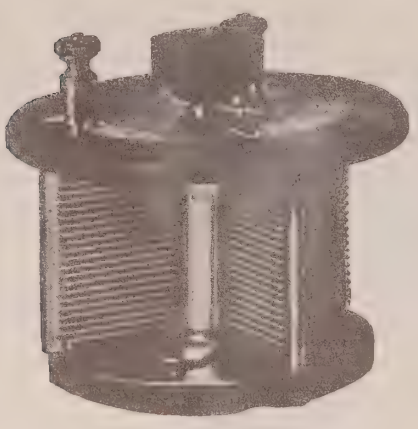


Variable Condensers

No. 366

A variable capacity used extensively in radio receiving sets. Its wide sale has proved the appreciation of amateurs, for, at the price, there is no similar instrument at all comparable in construction or in appearance. Polished composition case. 43 plates, semi-circular type. Maximum capacity approximately .001 mfd. Plates and separators cast as units. Fitted with 180-degree scale, turning knob and pointer. Size, 4″ high, 4¼″ diameter. Shipping weight, 2¼ lbs.

Catalog No.		Price Each
366	Variable condenser, complete	$4.75



Interior No. 366

The capacity unit of the No. 366 condenser, described herein. Includes complete plate sets, movable and stationary, with composition top, scale, pointer, knob, and bottom plate support, completely assembled. A complete working unit which may be mounted on a panel or in any suitable case. We do not supply this interior in separate parts. Shipping weight, 2¼ lbs.

Catalog No.		Price Each
366 Int.	Interior only, No. 366	$4.25

No. 367

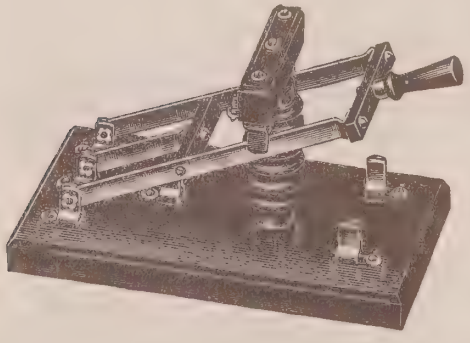
This variable capacity differs from our No. 366, described above, only in that the casing is transparent, affording opportunity to observe movements of the interior, if desired. It is offered to meet the needs of those whose personal preferences call for a condenser of this special construction. Shipping weight, 2 lbs.

Catalog No.		Price Each
367	Variable condenser, complete	$4.75

No. 368

A smaller capacity, embodying all the constructural features of our No. 366. Has 23 plates and a maximum capacity of approximately .0005 mfd. Casing the same as that of No. 367, described above. This capacity has proved satisfactory with valve circuits for undamped wave receivers. Interior only is furnished, if desired. Shipping weight, 1½ lbs.

Catalog No.		Price Each
368	Variable condenser, complete	$3.75
368 Int.	Interior only, No. 368	3.25



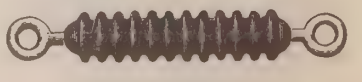
Antenna Switch No. 463

A large, sturdy, well built "change over" switch, suitable for use on sets up to 1 Kw. Base, mahogany finish; pillar support, moulded composition, insuring good insulation; copper blades. Fitted with third blade to disconnect receiver when transmitting. Shipping weight, 2½ lbs.

Catalog No.		Price Each
463	Antenna switch	$4.50

Antenna Insulators

A well insulated antenna contributes vitally to the success of any station. The insulators offered here are up to the best standards in materials and manufacture. The design is such that there is minimum leakage under all weather conditions. Structurally, they are fitted to withstand all stresses met in average radio installations. Shipping weight, No. 02, ½ lb.; No. 03, 1 lb.



Catalog No.		Price Each
02	4-inch	$ .35
03	10-inch	.80

Transmitting Condenser No. 483

The Murdock moulded transmitting condenser is distinctively superior to the average experimental condenser. It is built in solid sections, so constructed that brushing is eliminated, and in operation it is characterized by its extremely low internal losses, lower than those of any similar condenser. It is strong, convenient, and efficient. Investigation of its merits will prove its special value in amateur installations, especially with sets of the lower powers using rotary or quenched gaps. Capacity per section, .0017 mfd. Shipping weight per section, 3 lbs.

Catalog No.		Price Each
483	Moulded condenser, per section	$3.25

Transmitting Condenser No. 488

Similar in construction to our No. 483, but built of selected materials in sections of .002 mfd. capacity. Designed and constructed for those who desire the best. Shipping weight per section, 3 lbs.

Catalog No.		Price Each
483 R	Four-section rack only	$8.00
488	Moulded condenser, per section	$5.00

Condenser Rack No. 483 R

For convenience in mounting a bank of our No. 483 condensers we offer a rack. Well finished hardwood ends, brass bus bars, and copper wire connectors. Shipping weight, rack only, 10 lbs.

Catalog No.		Price Each
483 R	Four-section rack only	$8.00
	For each additional section over four, add	1.00

Line Protector No. 452

This is the generally approved type of line protector which will take care of all usual cases of "kickback." Large capacity condensers, with set of miniature spark gaps conveniently mounted. Should be in every station using any power line as a source of energy. Shipping weight, 7 lbs.

Catalog No.		Price Each
452	Line protector	$7.50

Line Protector No. 453

A somewhat different type of protector, utilizing the high resistance effect of special resistance rods. Has three resistance rods and two line fuses. Will positively take care of "kickback," if properly installed. Shipping weight, 5 lbs.

Catalog No.		Price Each
453	Line protector	$6.50

Rotary Parts No. 443 A

Moulded rotor having 12 fan blade electrodes and 2 stationary electrodes. Rotor will run absolutely true. Well finished base, with ingenious adjustments for stationary electrodes. Motor has protector. Shipping weight, complete gap, 5 lbs.

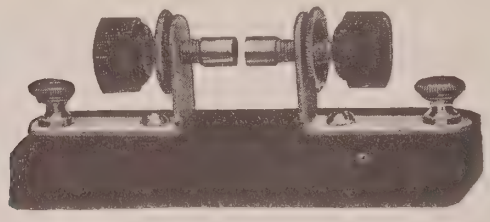
Catalog No.		Price Each
443 A	Rotor only for 3/16", ¼" or 5/16" shafts	$3.00
	All parts mounted	5.00

Rotary Parts No. 442 A

Special moulded rotor with 12 aluminum electrodes. Stationary electrodes easily adjustable. Finest rotary obtainable. Shipping weight, 5 lbs.

Catalog No.		Price Each
442 A	Rotor only for ¼", 5/16" or ⅜" shafts	$4.00
	All parts mounted	7.00

Stationary Spark Gap No. 440



A small, moderately priced, stationary spark gap, successfully used with induction coils and with sets of small output. Composition base, brass pillars and adjusting arms, zinc sparking points. A good looking little gap, not comparable with cheaper offerings. Shipping weight, ¾ lb.

Catalog No.		Price Each
440	Stationary spark gap	$ .90

Oscillation Transformer No. 424

For best sending practice, it has become necessary to use a transmitting transformer of this type in order to secure the sharp wave required by regulations. This is one of our best values. Hinged type, flat copper, ribbon wound, supplied with four connection clips. Shipping weight, 8 lbs.

Catalog No.		Price Each
424	Oscillation transformer for sending	$5.00

Connection Block No. 6 B

A handy little accessory for every radio station. Just the thing for connecting receivers. Screw block to table. Bring leads to block and insert cord tips at other side. Saves dragging of instruments when receivers are attached. Composition base, with binding posts and entering holes in sides. Shipping weight, ¼ lb.

Catalog No.		Price Each
6 B	Receiver connection block	$ .30

Hot Wire Meters

Reliable hot wire ammeters for measuring currents in antenna or for other purposes in connection with radio work. Smaller sizes have nickel-plated cases, with quadrant aperture for scale. Large size has heavy bevelled glass front. Zero adjustment. Shipping weight, 2 lbs.

Catalog No.		Price Each
470	Hot wire meter, 0 to .5 amperes	$ 7.50
471	Hot wire meter, 0 to 5 amperes	7.50
472	Hot wire meter, 0 to 10 amperes	13.00
473	Hot wire meter, 0 to .5 amperes, special	13.00

Hotpoint Radiant Grill

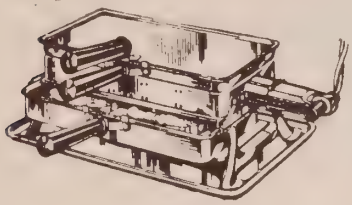
(Rectangular)

Broils, boils, fries, toasts, and pops corn.

Two operations may be performed at the same time, one above and one below the coils.

The pans fit below as well as above the heating unit. When only one operation is performed, one of the pans may be placed on the opposite side of the unit to deflect the heat.

Made of steel, polished nickel finish. Has deep pan with corrugated broiling grid, medium pan, shallow pan (which is also used as a cover for the others), recipe and instruction book, cord with attachment plug and interchangeable switch plug.



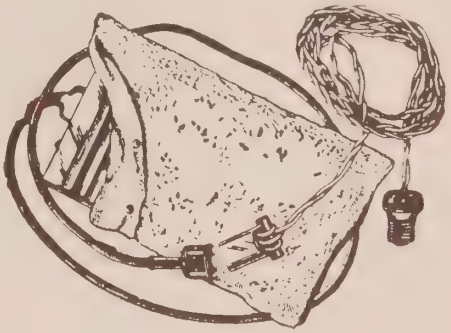
Catalog No. 20101 Weight, 5½ lbs.
Size over all, 7¼x10¾x3¾"
Price, $10.00

Hotpoint Safety Comfo

(Metal Flexible)

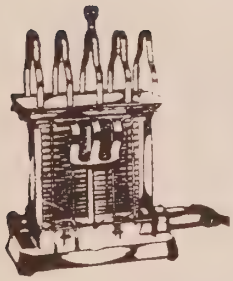
An electric hot-pad that successfully supersedes the hot-water bottle for all dry applications of heat to the body. Made of hinged metal units which make the pad as flexible as ordinary use requires. Conforms readily to body curves or may be wrapped around a limb.

The temperature is controlled by small lever at the top end of pad. Any temperature between 100 and 200 degrees Fahrenheit easily obtained and automatically retained. A small knob at the word "LOW" (temperature 100 degrees) permits the operator to adjust the lever in the dark or under the bed-covers. Completely equipped, ready for use. Has washable eider-down cover, cord, attachment plug and small contact plug. Interchangeable with aluminum Safety Comfo, Immersion Heater and Boudoir Set. The metal case is finished in highly polished nickel. Packed in "parchmyn" envelope and cardboard box.



Catalog No. 50151
Size, 6¼x10½" Weight, 1½ lbs.
Price, $9.75

Hotpoint Toaster



Toasts two slices of bread at one time, one slice on each side. Gravity operated bread clamps can easily be raised with slice of bread. The coffee, tea or cereal may be kept hot on top at the same time bread is toasting.

The bread-racks are 4½x5¼ inches, larger than the slices of a standard loaf.

Toast Rack fits top of Toaster snugly. It provides a handy receptacle for passing the toast.

Has ebonized, always-cool handle.

Toaster and Toast Rack made of steel; polished nickel finish. Toaster has cord and plugs.

Catalog No. 114T5 Weight, 2 lbs. Wattage, 450
Size over all, 4x6¾x7" Price, $7.25

We carry an extensive line of Quality Electrical Fans in all sizes, and reasonably priced. Write for our bulletin on Electrical Appliances for the summer season, which will be ready May 1st.

Hotpoint Valveless Percolator

Grecian Urn

This Grecian Urn design Machine Percolator on the table or buffet lends a touch of that "something" which appeals to culture and refinement. Very desirable for use in large families; for those socially inclined; for gift purposes.

Constructed of heavy sheet copper; inside lined with silver; finished in polished nickel; mounted on three-footed pedestal; feet fiber tipped; handles of ebonized wood; faucet.

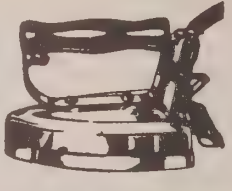
Equipped with Standard Hotpoint Percolating Apparatus and Safety Switch. (See description on page 10.) Has cord and plugs.

Cat. No. 725 Capacity, 9-cup Weight, 2 lbs. 6 oz.
Price, $28.00

Hotpoint Iron

Cat. No.	Weight	Soleplate
116	3 lbs.	3⅛x5 1/16"
117	5 lbs.	3⅝x6¼"
115F17	6 lbs.	4 x6¾"

Price, $7.25



The iron with the hot point, cold handle and attached stand. Heating unit is in two sections, arranged V-shape on the soleplate. The sections meet at the point of the iron, thus supplying most heat where most heat is needed, because, in use, the point is pushed forward into the damp goods. The heating unit is clamped between the heavy cast soleplate and pressure-plate, insuring excellent heat retention. Top is pressed steel. Finish, polished nickel all over. Has cord and sparable contact plug.

The 5 and 6-pound Hotpoint Irons are equipped with the Hotpoint Hinged Plug Cord Protector and Thumb Rest.

The new plug prevents troublesome cord breakage, remains always cool, and is easily removable.

The Thumb Rest is an additional convenience which will be much appreciated by the housewife. It rests the wrist and makes ironing easier.

Hotpoint Hedlite Heaters

Made of pressed steel; reflector has triple coat of copper, highly polished; back finished in black enamel, as is also the diamond-shaped frame around the reflector; base and upright finished in highly polished nickel. Wire guards over heating element, easily removable. Ebonized wood handle at back makes heater easily portable.

Approved by National Board of Underwriters.

Cat. No. 116A4 Weight, 4 lbs. Price, $11.00

Nickel-plated Vest Pocket Tungsten Flashlights

No. 3434	Size, ⅝x1½x2⅞, complete	$1.00
No. 1042	Renewal battery	.30
No. 545	Renewal Tungsten bulb	.17
	(Two-cell battery in above light)	
No. 3439	Size, ¾x2⅜x3¼, complete	$1.25
No. 1041	Renewal battery	.35
No. 546	Renewal Tungsten bulb	.17
	(Three-cell battery in above light)	

Steady Contact Penlite

Fashioned to fit the vest pocket just like a fountain pen, with a fountain pen clip attachment.

No. 3506 Japanned black finish No. 3507 Oxidized finish No. 3508 Nickel-plated	Complete with battery	Choice **$1.00**

Tungsten Nickel-plated Tubular Flashlights

No. 6761	Size, 1¼ x 5 inches, complete	$1.25
No. 1029	Renewal battery	.30
No. 504	Renewal Tungsten bulb	.17
No. 6764	Size, 1½ x 6½ inches, complete	$1.50
No. 1028	Renewal battery	.30
No. 504	Renewal Tungsten bulb	.17

Miners' Nickel-plated Tubular Flashlights

No. 6768	Size, 1½ x 6½ inches, complete	$2.00
No. 1028	Renewal battery	.30
No. 504	Renewal Tungsten bulb	.17

(The above light has large bell shaped protruding reflector)

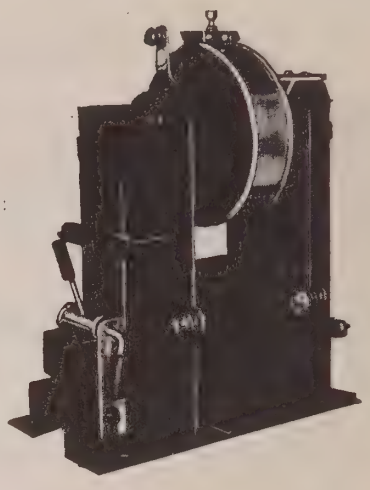
Tungsten Miners' Flashlights

No. 6788	Size, 1½ x 6½ inches, fibre case	$1.50
No. 1028	Renewal battery	.30
No. 504	Renewal Tungsten bulb	.17

We carry a complete stock of electrical supplies ready for immediate deliveries.

Should you be in need of any supplies, such as Attachments, Sockets, Standard Switches, Lamp Cords, etc., write us and we will supply you at the current market prices.

THORDARSON
TYPE "R"
110 Volts 60 Cycles
WIRELESS
TRANSFORMERS
Made in 1, ¾, ½ and ¼ K. W. Sizes



1 K. V. A. Wireless Transformer

This new 1 K. V. A. Type "R" 25,000 volt air cooled wireless transformer is the peer of them all.

It embodies the principle of the closed core double magnetic circuit. One magnetic circuit being variable, to give great regulation of voltage, capacity and re-actance.

The core is of high silicon steel .008 (8 mills) thick, laminated.

Magnetically, mechanically, and electrically the best. Operates at the remarkable efficiency of 92%. High factor of safety, liberal design, and best of materials.

In appearance the type "R" represents a very great improvement over any other type of wireless transformer on the market. Brass, steel and aluminum have been judiciously utilized, not only with the idea of making this design most efficient, but handsome as well. Too often the transformer part of the wireless equipment is crude and unsightly. We have made the type "R" in keeping with the rest of the apparatus, a device to which the operator can point with pride.

The essential feature of the "THORDARSON" Wireless Transformer has always been its magnetic shunt control. This feature protects the transformer from all undue current surges, such as are present in operation.

The type "R" transformers are designed to be connected direct to source of alternating current. No impedence or choke coil is necessary.

Mechanical

Elimination of all castings, springs and adjustable screws.
Pressed sheet steel and brass clamps used throughout.
25% reduction in weight.
Magnetic shunt circuit held rigidly in place.
Instant and simple means of regulation by a system of lever and eccentric cams.
Special mechanical shield for high tension coils.

Magnetical

Our new tooth core construction used throughout. Minimum iron losses.
Shunt magnetic circuit opened by means of specially designed laminated tongue, moving in horizontal plane with noiseless operation at all positions.

Electrical

25% greater efficiency.
10% greater capacity.
Wider range.
Special grounding terminal provided.
Elimination of all taping from primary and secondary coils.
Insulation compound of high di-electric strength used throughout.
Vacuum impregnating treatment of high tension coils.
Special folded layer insulation used in high tension coils.
Complete transformer, oil and waterproof.
Special corona shield for high tension coils.
Position of primary and secondary coils reversed to allow more convenient handling of high voltage.
No high tension bushings.
No high tension cables.
Two features patented.
Three others pending.

TYPE "R" 110-Volt—60-Cycle, Wireless Transformers

K. V. A.	Secondary Voltage	Height	Width	Length	Shipping Weight	PRICE
1	25,000	15 inches	7 inches	12 inches	55 lbs.	$40.00
¾	10,000	11 inches	5½ inches	10 inches	35 lbs.	28.00
½	10,000	10 inches	5 inches	9 inches	30 lbs.	22.00

¼ K. V. A. Wireless Transformer

Although this is about the cheapest wireless transformer on the market, it embodies the same essentials of high-grade workmanship as our more expensive type "R" Wireless Transformers. This design is built without an adjustable shunt.

An actual test of a ¼ K. V. A. Transformer (no primary choke coil of re-actance used), and our condenser at a capacity of .0072 microfarads (8 plates of .009 M. F. each), 1¼ primary turns of our oscillation transformer (tuned to 200 meters), a rotor of 16 teeth driven at 1,000 R. P. M. showed the primary circuit at 110 volts, drawing 2.7 amperes. The Wattmeter reading was 270 watts. This gives a power factor of 91%.

K. V. A.	Secondary Voltage Special	Height	Width	Length	Shipping Weight	PRICE
¼	8,000	8 inches	4½ inches	6 inches	12 lbs.	$14.00

With our transformers we recommend the use of high non-inductive resistances, connected in shunt across the primary terminals as a prevention of inductive kick-backs in the primary circuit.

Price, per pair.....$1.50

Transmitting Condenser

In as much as actual tests proved the oil immersed condenser to be more efficient than any other type, we also find it to be a great favorite of the amateurs.

The di-electric is phenol fibre. In actual tests this insulation withstood a potential of 48,000 volts before breaking down. This permits an overload of nearly 100 per cent when using our Type "R" 1 K. V. A. 25,000-volt wireless transformer. The edges of the sheet aluminum are rolled and the corners rounded, thereby preventing a loss of energy from corona or brush discharge.

Between each two sheets of aluminum on each terminal of the condenser is inserted a third sheet, which is corrugated. This arrangement permits the oil to penetrate and circulate, and at the same time prevents heating.

There is practically no loss of energy due to heating, corona, or brush discharge, and, therefore, the maximum of efficiency is attained.

The outstanding feature of this condenser is the arrangement of the 10 terminals. The capacity can be increased from a minimum of .0018 M. F. to a maximum of .009 M. F. in single steps of .0009 M. F. each. This permits very fine adjustment in the closed secondary circuit, and the number of turns on the primary of the oscillation transformer can be increased or decreased by merely decreasing or increasing the capacity of the condenser.

After assembling, the condenser is immersed in a container of oil, as it is a well known fact that the greater number of long distance amateurs use an oil immersed condenser.

Condenser	Height	Width	Length	Shipping Wt.	PRICE
Complete	13 inches	9 inches	5 inches	35 pounds	$27.00

Oscillation Transformer

Primary of this Oscillation Transformer consists of 3¾ turns of 1-inch heavy copper ribbon supported in fibre strips. The secondary consists of 7¾ turns mounted same as primary. Primary inductance is approximately 4.5 microhenries. When maximum turns on the primary are used with condenser having a capacity of .009 microfarads, the wave meter shows a reading of 385 meters. Using one complete outside turn or an inductance of about 1.2 microhenries and a condenser capacity of .009 microfarads, the wave meter shows a reading of 205 meters. Secondary inductance is approximately 10.9 microhenries. When using a condenser capacity of .004 microfarads to .009 microfarads, a very select range of short wave lengths can be attained.

Height	Width	Length	Shipping Wt.	PRICE
18 inches	16 inches	9 inches	7 pounds	$8.00

Rotors for Rotary Spark Gap

The Rotor of electrodes is of ⅛-inch hard aluminum, 8 inches in diameter. The center disc is phenol fibre. Actual test with the Rotor of 16 teeth on a motor driven at 1,000 R. P. M. to 1,500 R. P. M. produces a low note with carrying quality. The same tone was produced with the Rotor of 8 teeth and motor driven at 2,000 R. P. M. to 3,000 R. P. M. The tone can be varied by regulating the speed of the motor, but it is the low note that makes amateurs heard at long distance.

When ordering, please measure diameter of motor shaft (with micrometer, if possible) and we will turn a hub of proper size to fit. Also state whether you want a Rotor of 8 or 16 teeth.

Shipping weight, 1 lb. Price, $5.00

Transmission of Weather Reports by Naval Radio Stations

Through co-operation with local offices of the United States Weather Bureau, weather forecasts are sent broadcast to sea through naval coast radio stations at certain times, varying with the locality. Coast stations are generally prepared to give local forecasts to passing vessels without charge, on request. Storm warnings are sent whenever received, and the daily weather bulletins are distributed by the naval radio stations at Washington, D. C., and Key West, Fla., a few minutes after the 10 p. m. time signal. These bulletins consist of two parts.

The first part contains code letters and figures which express the actual weather conditions at 8 p. m., seventy-fifth meridian time, on the day of distribution, at certain points along the eastern coast of North America, one point along the Gulf of Mexico, and one at Bermuda.

The second part of the bulletin contains a special forecast of the probable winds to be experienced a hundred miles or so off shore, made by the United States Weather Bureau for distribution to shipmasters. The second part of the bulletin also contains warnings of severe storms along the coasts, as occasions for such warnings may arise.

Immediately following this bulletin, a weather bulletin for certain points along the Great Lakes is sent broadcast by the naval radio station at Washington, D. C., consisting of two parts. The first part contains code letters and figures which express the actual weather conditions at 8 p. m., seventy-fifth meridian time, on the day of distribution, at certain points along the Lakes. The second part of the bulletin contains a special forecast of the probable winds to be experienced on the Lakes during the season of navigation—about April 15 to December 10.

The points for which weather reports are furnished are designated as follows: **For Atlantic coast and Gulf points,** S—Sydney, T—Nantucket, DB—Delaware Breakwater, H—Hatteras, C—Charleston, K—Key West, P—Pensacola, and B—Bermuda; **for points on the Great Lakes,** Du—Duluth, M—Marquette, U—Sault Ste. Marie, G—Green Bay, Ch—Chicago, L—Alpena, D—Detroit, V—Cleveland, and F—Buffalo.

All bulletins begin with the letters U S W B (United States Weather Bureau) and the weather conditions follow. The first three figures of a report represent the barometric pressure in inches (002—30.02); the next figure, the fourth in sequence, represents the direction of the wind to the eight points of the compass: 1—north, 2—northeast, 3—east, 4—southeast, 5—south, 6—southwest, 7—west, 8—northwest, and 0—calm. The fifth figure represents the force of the wind on the Beaufort Scale, given on following page.

Beaufort Scale of Wind Force

Number and Designation	Statute Miles Per Hour	Nautical Miles Per Hour
0 Calm	0 to 3	0 to 2.6
1 Light air	8	6.9
2 Light breeze	13	11.3
3 Gentle breeze	18	15.6
4 Moderate breeze	23	20.0
5 Fresh breeze	28	24.3
6 Strong breeze	34	29.5
7 Moderate gale	40	34.7
8 Fresh gale	48	41.6
9 Strong gale	56	48.6
10 Whole gale	65	56.4
11 Storm	75	65.1
12 Hurricane	90 and over	78.1 and over

In order to simplify the code, no provision has been made for wind force greater than 9, strong gale, on the Beaufort Scale. Whenever winds of force greater than 9 occur, the number representing them is given in words instead of figures, thus: Ten, eleven, etc.

Examples of Code

U S W B S 96465 T 91674 DB 94686 H 99886 C 01214 K 02622 P 03613 B 00065

Translation

United States Weather Bureau.

Station	Pressure	Wind Direction	Force*
Sydney	29.64	SW	5
Nantucket	29.16	W	4
Delaware Breakwater	29.46	NW	6
Hatteras	29.98	NW	6
Charleston	30.12	N	4
Key West	30.26	NE	2
Pensacola	30.36	N	3
Bermuda	30.00	SW	5

* See Beaufort Scale.

Are you

Registered in our

RADIO DIRECTORY

If not, send for our

Radio Directory Application

U S W B Du 95826 M 97635 U 00443 G 96046 Ch 95667 L 00644 D 00842 V 01054 F 01656

Translation

United States Weather Bureau.

Station	Pressure	Wind	
		Direction	Force*
Duluth	29.58	NE	6
Marquette	29.76	E	5
Sault Ste. Marie	30.04	SE	3
Green Bay	29.60	SE	6
Chicago	29.56	SW	7
Alpena	30.06	SE	4
Detroit	30.08	SE	2
Cleveland	30.10	S	4
Buffalo	30.16	S	6

* See Beaufort Scale.

The naval radio station at Great Lakes, Ill., transmits a weather bulletin at 10 a. m. and 10 p. m., ninetieth meridian time, daily, on a wave length of 1,512 meters. This bulletin is similar to the second bulletin sent out by Washington station, and is for the States of Illinois, Missouri, Iowa, Minnesota, North Dakota, South Dakota, Nebraska, Kansas, Wisconsin, and also for the upper lakes. Storm warnings are sent out as soon as received and broadcasted every four hours the next day.

Radio Time Signals of the World

Location	Call	Meters	Time Transmitted
Washington, D. C.	NAA	2500	Noon and 10 p. m., 75th Mer., Stan. Time.
Great Lakes, Ill.	NAJ	1515	11 a. m., 90th Mer., Stan. T.
Key West, Fla.	NAR	1500	Noon and 10 p. m., 75th Mer., Stan. Time.
San Francisco, Calif.	NPG	2400	Noon and 10 p. m., 120th Mer., Stan. Time.
New Orleans, La.	NAT	1000	Noon, 75th Mer., Stan. Time.
San Diego, Calif.	NPL	2400	Noon, 120th Mer., Stan. T.
San Diego, Calif.	NPL	9800-U	Noon, 120th Mer., Stan. T.
Eureka, Calif.	NPW	2000	Noon, 120th Mer., Stan. T.
Point Arguello, Calif.	NPK	1515	Noon, 120th Mer., Stan. T.
North Head, Wash.	NPE	2800	Noon, 120th Mer., Stan. T.
Darien, Canal Zone, P.	NBA	4000	1 p. m., 75th Mer., Stan. T.

The above listed Naval Stations transmit "Time Signals" each day for a period of five minutes in advance of the specified schedules. Every tick of a standard Naval observatory clock is transmitted as a dot, omitting the twenty-ninth second of each minute; the last five seconds of each of the first four minutes; and, finally, the last ten seconds of the last minute. The 12 noon, 1 p. m. and 10 p. m. signal is sent as a dash.

Note.—NAJ, NPL, NPK, NPW: During that part of the season in which the daylight saving law is in effect the time signals mentioned above will be transmitted exactly one hour earlier than the above schedules of NAJ, NPL, NPK, and NPW.

Foreign Stations

Location	Call	Meters	Time Transmitted
Darsena Norte, Argentine Republic	LIA	800	From 1:56'00" to 2:00'00" (Greenwich Mean Time). ¼ sec. dot transmitted at 2:00'00"
Choshi, Japan	JCS	600	From 8:50'00" to 9:04'00" (Central Jap Time) (135th Meridian East). At 9:04 a one second dash is sent.
Cape Town, South Africa	VNC	600	From 8:59'00" to 9:00'00" (Greenwich Mean Time). At 9:00'00" a sec. dash.

American Undamped Radio Stations

Washington, D. C.	6,000		NAA
Boston, Mass.	5,700		NAD
Great Lakes, Ill.	5,700		NAJ
Norfolk, Va.	5,200		NAN
Charleston, S. C.	4,700		NAO
Key West, Fla.	6,500		NAR
New Orleans, La.	5,500		NAT
San Juan, P. R.	5,250		NAU
Guantanamo, Cuba	4,500		NAW
Point Isabel, Texas	8,500		NAY
Darien, Canal Zone, Panama	7,000		NBA
Sayville, L. I.	9,800	11,600	NDD
New Brunswick, N. J.		13,600	NFF
San Diego, Calif.	9,800	13,300	NPL
San Francisco, Calif.	4,800	8,600	NPG
Tuckerton, N. J.		9,200	NWW
Marion, Mass.		Unknown	WSO
Annapolis, Md.		16,900	NSS
Portland, Me.		5,700	NAB
Balboa, Canal Zone		7,000	NPJ

Undamped Wave Stations of the United States and Possessions

Annapolis, Md.	NSS	16,900
Arlington, Va.	NAA	6,000
Balboa, Canal Zone	NBA	7,000
Boston, Mass.	NAB	5,700
Cavite, P. I.	NPO	12,000
Charleston, S. C.	NAO	4,700
Cordova, Alaska	NPA	7,600
Great Lakes, Ill.	NAJ	5,700
Guam, Marianna Islands	NPN	5,000
Guantanamo, Cuba	NAW	4,500
Key West, Fla.	NAR	6,500
Marion, Mass.	WSO	Unknown
New Brunswick, N. J.	NFF	13,600
New Orleans, La.	NAT	5,500
Pearl Harbor, Hawaii	NPM	11,000
Puget Sound, Wash.	NPC	5,250
San Diego, Calif.	NPL	13,300
San Francisco, Calif.	NPG	8,600
San Juan, Porto Rico	NAU	5,250
Sayville, L. I.	NDD	11,600
Tuckerton, N. J.	NWW	9,200
Tutuila, Samoa	NPU	6,000

British Stations

Barrington Passagem, N. S.	VCU	5,000
Bermuda, W. I.	BZR	5,000
Carnarvon, Wales	MUU	14,000
Christiana, Jamaica	BZQ	5,000
Hong Kong, China	BXY	5,000
Norsea, England	BYC	4,500
Ponta Delgada, Azores	BWP	2,000
Singapore, Malay Pen.	VPW	3,400
St. John's, Newfoundland	BZM	5,000

French Stations

Eiffel Tower, Paris	FL	10,000
Lyons	YN	15,500
Nantes	UA	11,000

Italian Stations

Rome	IDO	11,000

German Stations

Hanover (Eilvese)	OUI	15,000
Nauen	POZ	12,600

Miscellaneous Undamped Stations

Funabashi, Japan	JJC	10,000
Stavanger, Norway	LCM	12,000
Java, Dutch East Indies	PMN	6,100

Damped Wave Stations

Arlington, Va., U. S. A.	NAA	2,600
New Orleans, La., U. S. A.	NJK	1,800
Apia, Samoa	VMG	2,000
Clifden, Ireland	MFT	6,000
Glace Bay, N. S.	GB	7,500
Nauru, Pacific Ocean	VKT	2,200
Poldhu, Ireland	MPD	2,800
Rabaul, Pacific Ocean	VJZ	2,900
Yap, Pacific Ocean	YAP	1,800
Coltano, Italy	ICI	6,500
Berlin, Germany	LP	5,500
Mexico City, Mex.	XDA	4,000
Petrograd, Russia	TSR	7,000